Developing EFL learners' listening comprehension through a computer-assisted self-regulated prosody-based listening platform

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Abstract

Research has shown that the development of the listening ability in Second Language (L2) learning is of crucial importance to the emergence of other language skills. Moreover, listening is considered as an individualized activity and the listeners may vary in how they make sense of the input. Therefore, in an attempt to help L2 learners enhance their L2 listening comprehension, this study built a computer-assisted prosody-based self-regulated listening platform and investigated its effects on improving the listening comprehension of 65 beginning Vietnamese college students of English as a Foreign Language (EFL). The study employed a mixed-methods approach within a quasi-experimental design. For 10 weeks, the experimental group practiced listening with prosody-based activities in a self-regulated learning environment. The results indicate that the experimental group significantly outperformed the control group in their listening performance. The outcome underlines the value of prioritizing prosody by using the techniques developed in the present study such as listening to low-pass filtered audio, repetition in synchrony with body movements, and shadowing to enhance listening comprehension. In addition, data from students' journals and interviews reveal that learners had positive opinions about the listening approach used in terms of its effectiveness as well as its efficiency. In light of these findings, the study discusses some pedagogical implications in the field of listening and proposes recommendations for further research.

Keywords: Listening comprehension, prosody, CALL, self-regulated learning, verbotonalism

Introduction

Listening ability is recognized as an important factor in the process of second language learning because listening is considered as a means to internalize the rules of language as well as a facilitator for the emergence of other language skills (Feyten, 1991; Morley, 2001). According to Vandergrift (1999), at the early stages of language learning,

preeminence should be given to the development of the listening ability because this is a natural way of learning a new language. However, the listening skill is often neglected due to its inherent complexity (Lynch, 2011). At the same time, L2 learners still face many listening problems (Ozcelik et al., 2019). One of the reasons is that beginning L2 listeners often suffer not only from memory constraints but also limited L2 language knowledge. Their autonomous processing mechanism is not fully developed (Vandergrift, 2011) but they often try to decode every linguistic element in the auditory input (Færch & Kasper, 1986). Besides, L2 listeners also often use the same metrical expectations for understanding their L2 as they do for understanding their native language (Lynch, 1998). This may be helpful if the two languages are similar but may become an obstacle if they are quite different. Altogether, what these L2 listeners are doing tends to slow down their comprehension. What is more, although the product of listening tends to be unobservable, the common approach to the teaching of listening typically is product-oriented with the same cycle of activities: listen to the audio, answer the questions, and check the correctness (Huong & Abbott, 2017). Although listening is an individualized and internalized activity, L2 listeners are rarely given opportunities to personalize their listening practice and to bring their related knowledge as well as experience into this comprehension process. The time-on-task devoted to developing L2 listening comprehension in class is also insufficient, and that makes the situation worse. Therefore, in such a context, there is a pressing need for finding an appropriate approach to the teaching of listening to help L2 listeners improve their listening ability.

In the field of L2 listening, previous research has established that prosody training can help learners develop their L2 listening ability (e.g., Han, 1996; Huang, 2009; Ketttongma & Wasuntarasobhit, 2015; Kissling, 2018). These studies suggest that prosody and listening comprehension are closely related and directing learners' attention to prosodic features can help them identify the most salient piece of auditory information for more effective listening comprehension. However, these investigations remain narrow in focus since they appear to deal with only explicit instructions on certain prosodic cues and seem to lack support from a theory of perception.

Meanwhile, the existing body of research on self-regulating learning (SRL) and listening comprehension has demonstrated that there is a close association between SRL and L2 listening (Chen & Zhang, 2011; Lem, 2019; Pintrich & Groot, 1990; Yu & Chen, 2010; Zeng & Goh, 2018). These researchers revealed that learners are more motivated to practice listening in an SRL environment and have positive attitudes towards this approach. Yet, their arguments are only based on qualitative data and still need empirical verification. For this reason, this study was conducted to provide quantitative evidence on this issue.

Taken all together, the present research investigates, for the first time, the effects of the prosody-based practice in a self-regulated listening platform on EFL learners' listening comprehension. The originality of this study is that the listening platform was built on a theory of perception and included techniques designed based on the functions of the human brain in language learning. At the same time, the study also explores learners' opinions on this listening platform. Thus, the research questions (RQs) are as follows:

RQ1: Do learners improve their listening comprehension after receiving prosody-based practice in a computer-assisted self-regulated listening platform? If yes, in what way?

RQ2: What are the learners' opinions on this computer-assisted self-regulated listening platform?

Review of literature

Listening comprehension

According to Witkin (1990), the listening process is a very complex phenomenon because it involves hundreds of variables. As Dunkel (1991) states, it is clear that internal and external components may interact in a variety of ways to make the L2 listener's task easier or more complex, but what remains unclear is exactly how each one functions to influence the comprehension of listeners from various cultural backgrounds, of different levels of language proficiency and possessing different learner traits. Meanwhile, Vogely (1995) describes listening as a process of constructing meaning based on a multidimensional relationship between learners and the intrinsic as well as extrinsic elements involved. Indeed, to comprehend, the listeners need to reconstruct the incoming signals by making use of both bottom-up and top-down processing and by drawing on what they already know to make use of the new language (Nunan,1995). However, what arrives at the listeners' ear is not separated units but words embedded in a continuous stream of speech (Vogely, 1998). This tends to take the opportunity to process auditory information fleeting and transitory. Furthermore, these signals often arrive at speed, vary in form, and overlap or occur simultaneously, which often influences the comprehensibility of speech in real-time, even though the listeners may know all of the words used in the stream of speech.

Because understanding the L2 listening process is quite challenging, different disciplines have proposed a wide range of definitions with various focuses on the listening process. Yet, in a general sense, they have some commonalities which are perception, attention, interpretation, and memory (Glenn, 1989). Apparently, in real-life listening, in most instances, the interpretation will never be a perfect match because each individual's life experience establishes different frames of reference for every communicative encounter. In other words, the process of constructing meaning is influenced not only by the listeners' attention level but also by their perceptual filters (Wolvin, 2018). The listeners bring a lifetime of cognitive, affective, and behavioral experiences to any communication interaction, and those experiences influence how they interpret the incoming input: they form a perceptual filter. As Burley-Allen (1995) puts it: "We each have our meaning for words because we filter them through our varied beliefs, knowledge, education, upbringing, and experience. As a result, no two people have the same meaning for the same word; meanings are not in words, meanings are in people" (p. 65).

Having said that, to facilitate learners' listening comprehension, it is suggested to start with their auditory perception by providing them with optimal listening conditions in which the listeners should be given more choice to make use of their existing knowledge to retune decision-making for future encounters in listening. In this way, their idiosyncratic meaning-making mechanism is respected. The learning process can be guided, influenced, enhanced, or stifled by the classroom and the instructor, but the bottom line is that learning is a heuristic process that begins and ends with the individual

learner (Winitz, 1981). Therefore, in the case of listening, teachers cannot teach the students. Instead, they should create a learning environment in which learning how to comprehend spoken language will develop spontaneously and in its own way in the minds of the students.

The role of prosody in listening comprehension

Prosody here refers to the combination of rhythm and melody of utterances, which are considered as "road signs" for making meaning of the incoming language (Gilbert, 2008, p. 8). According to Frazier et al. (2006), prosodic information is central to understanding spoken language because it might supply the basic skeleton which enables listeners to hold an auditory linguistic sequence in memory while the brain processes it. Likewise, Jilka (2000) claims that prosody is a significant factor in identifying and distinguishing languages since different languages have different rhythms, grammatical and phonetic systems. Moreover, for L2 listeners, the melody and rhythm of their first language have become well-ingrained from an early age and make it more difficult to interpret the target language's prosodic signals to achieve comprehension (Yang, 2016). In light of the important role that prosody plays in understanding spoken language, prosodic training needs to be considered of central rather than peripheral concern in listening comprehension.

Research has shown that several techniques have been utilized to sensitize listeners to the prosodic patterns of a target language. For instance, learners have had their attention drawn to the melody of utterances by using nonsense syllables (Flores, 1997; Rançon, 2018). In this case, teachers must sing the model sentences by replacing the verbal messages with nonsense syllables such as TI for unstressed syllables, TA for stressed syllables. Another way is to incorporate the movement and rhythm of body muscles with stress and intonation (Chan, 2018). Teachers themselves can also hum the melody of the utterances for the learners. In general, in the above-mentioned techniques, the demonstration of the teacher is unavoidable. The technique used in the present study was listening to low-pass filtered recordings which are described as speech containing only the prosodic characteristics without any lexical or syntactic cues (Snel & Cullen, 2013). This is an effective method in terms of its authenticity in preserving the prosodic patterns and its efficiency in minimizing teachers' efforts while promoting learners' autonomy (Rançon, 2018). Most importantly, the unfamiliarity of listening to filtered recordings helps learners bypass their normal processing mechanisms and stimulate the right hemisphere of their brain (Hesling et al., 2005; Meyer et al., 2004). In this respect, it also reflects the argument of McGilchrist (2019) about how the human brain works in the realm of language learning. He states that any new verbal input must be processed by the right hemisphere first before shifting to become the focus of the left hemisphere.

Throughout the literature, several researchers have attempted to examine the effectiveness of prosody training on listening comprehension. One of the initial authors is Han (1996) who investigated the effects of pronunciation-oriented listening practice on Korean university students' listening pronunciation. Han (1996) found that these prosodic elements were indispensable for understanding fluent and conversational speech and that they have a closer relationship with listening than segmental aspects. In the same manner, Huang (2009) reported a positive relationship between listening comprehension and prosodic features by analyzing Chinese EFL learners' recordings based on three criteria:

stress, rhythm, and intonation. The findings of Huang's analysis (2009) indicate that the teaching of suprasegmental features of pronunciation can help students overcome some common obstacles in their listening and achieve effective comprehension. Students become more sensitive to the prosodic cues of natural speech, tend to make meanings in chunks instead of word by word, and can follow the speech despite its fast speed. This effectiveness is further tested by Kettongma and Wasuntarasobhit (2015) who provided 34 low-intermediate EFL learners with lessons on prosodic components such as word stress and sound linking. Data analysis revealed that these explicit instructions positively affect learners' awareness of learning, resulting in their listening improvement. In a similar vein, in a comparison between perception-focused and production-focused practice in segmental or suprasegmental features, Kissling (2018) found that pronunciation instruction on suprasegmental features with perception-focused practice could help learners in segmenting the speech stream in their dictation tasks. This is to say, directing learners' attention to prosodic features can help them identify the most salient pieces of information about aural speech and facilitate their listening comprehension.

Verbotonalism - a theory of perception

Verbotonalism or the verbotonal approach was invented by Petar Guberina (1913-2005) with the original aim to treat a hearing-impaired person in their first language. Later, it was applied to foreign language learning by using the same mechanism. In particular, verbotonalism is used for maximizing the conditions of perception by presenting to the listeners a model that makes them better aware of the elements that remain foreign to them (Rançon, 2018). The underlying assumption of the verbotonal method is that L2 learners may listen to the target language through their L1 "phonological sieve" (Trubetzkoy, 1939, as cited in Intravaia, 2013). This functions as a phonological filter during their listening and may affect their comprehension. As explained by Intravaia (2013), the learning of a foreign system is challenging as the old system is deeply rooted as learners' experience since birth. Therefore, to help learners to overcome their perceptual problems, it is necessary to reeducate their ears to improve their perception, which may result in better production (Boureux, 2012). While verbotonalism prioritizes prosodic features, it also stresses the importance of synchrony between body movement and speech. The underlying reason is that speech and body movements are rhythmically coordinated to produce what has been called interactional synchrony or synchrony between speakers (Condon & Ogston, 1966). In communication, self-synchrony occurs but interactional synchrony does, too.

A self-regulated learning environment

Self-regulated learning (SRL), in a broad sense, seems to be equal to self-directed learning which, in turn, refers to a process in which learners take initiative with or without assistance in determining their learning needs and goals, specifying learning resources, choosing and implementing appropriate learning strategies and evaluating learning outcomes (Knowles, 1975). According to Zimmerman (1989), students can be described as self-regulated to the degree that they are metacognitively, motivationally, and behaviorally active participants in their learning process. Likewise, Pintrich (1995) refers to self-regulated learning as the regulation of three aspects of learning. First, students are

actively in control of the resources available to them. Second, students know how to self-regulate their motivation and affect to adapt to the demands of the course. Finally, they can control various cognitive strategies of learning such as monitoring and judging their performance, etc.

In the present study, the term self-regulated learning is relatable to their self-regulation in listening activities. It can be understood as a mode of learning in which learners are in control of their listening process. They are given a degree of choice when selecting tasks, time, and location. They are given more opportunities to bring their background knowledge and experience into the listening process. Also, they are encouraged to self-monitor and self-evaluate their listening performances.

A computer-assisted self-regulated listening platform was developed to serve the purposes of the study. In Beatty's (2010) view, Computer Assisted Language Learning (CALL) is referred to as "any process in which a learner uses a computer and, as a result, improves his or her language" (p. 8). Indeed, CALL has the potential to provide both teachers and learners with the support necessary in a self-regulated learning environment. For learners, they can gain more control over the learning process, and teachers, they can make a shift from a "sage on the stage" to a "guide on the side" (Hubbard & Levy, 2006, p. 240)

In Asian contexts where English is not widely encountered daily, the benefits of CALL for language learning in general and for developing listening ability in particular beyond the four walls of the classroom seems to be more viable (Widodo et al., 2017). As stated by Cummins and Davison (2007), CALL enables learners to listen at their own pace in a private and stress-free environment. In particular, it offers valuable sources of authentic materials for listening activities that need a great deal of repetition (Fouz-González, 2015). In the same way, Vandergrift (2011) claims that CALL can be utilized for practicing perception skills such as delivering repeated audio and transcripts of audio text. Most importantly, CALL offers a platform for students to personalize their learning and support their self-regulatory processes (Kitsantas & Dabbagh, 2011). In this way, learners' autonomy will be promoted in the sense that they may develop the ability to take responsibility for their learning and to apply active, personally meaningful strategies to their work both inside and outside the classroom (Littlewood, 1990).

Previous studies have shown that there is a close association between self-regulated learning (SRL) and listening comprehension (Lem, 2019; Pintrich & Groot, 1990; Yu & Chen, 2010; Zeng & Goh, 2018). For instance, Pintrich and Groot (1990) argued that the use of self-regulating strategies is essential for academic performance. Similarly, in a study by Lem (2019), investigating the relationship between SRL and L2 listening performance, it was found that SRL was significantly correlated with L2 listening competence in the case of 35 EFL Vietnamese learners. By the same token, the results of the questionnaire research by Yu and Chen (2010) demonstrate that SRL in a network environment has a positive influence on improving EFL students' listening. Likewise, Zeng and Goh (2018) reported a case study involving four college EFL Chinese students over six months of SRL in developing their listening in independent settings. The results of their study reveal that learners with different achievement levels appear to utilize different self-regulatory skills in L2 listening. Taken together, these studies indicate that there is a positive relationship between SDL and L2 listening comprehension. However, whether these learners can improve their listening comprehension in a self-regulated listening environment remains unclear.

Method

Procedures

Sixty-five Vietnamese EFL learners from two intact classes at a college in Ho Chi Minh City participated in the experiment. They were first-year students from different non-English major disciplines. After being provided with informed consent information about the details of the study and agreeing to participate, students in the two classes were randomly assigned to a control group (CG) and an experimental group (EG). Results of a CEFR-based and validated language proficiency test (the DIALANG test at www.dialang.org) showed that there was homogeneity among students in the two groups and that they were all at A1 level.

During a 10-week period, the control group was taught listening comprehension with a traditional, classroom-based method. For the experimental group, the students practiced listening with some prosody-based activities in a self-regulated learning environment which operated on a self-access web-based platform called *Listening Vitamins Course*. There were 30 Vitamins, or short conversations, in the course. Each Vitamin was built on the same protocol consisting of three phases, described as follows: (see Table 1)

Table 1
Screenshots of the three phases of the learning protocol

Phase 1: FEEL IT

Phase 2: CHEW IT

Phase 3: SWALLOW IT

Phase 1: FEEL IT. The main goal of this phase was to help students become sensitized to and internalize prosodic patterns of some utterances. There were four sentences in this phase. First, students listened to a low-pass filtered recording 15 times (cutoff frequency was set to 320Hz) to feel the melody of the sentence. Second, they listened to an unfiltered recording of the utterances 10 times and were encouraged to repeat it in synchrony with gestures. Third, they listened to the low-pass filtered recording 10 times again while repeating the utterances and producing gestures. In this case, it is argued that producing gestures while repeating can help learners develop their sensitivity to prosodic patterns and internalize them into body memory. Fourth, they were asked to write down what they could hear by entering text into a textbox. Finally, when they decided to click the Submit button, the transcript of the audio was shown for them to self-assess their responses.

Phase 2: CHEW IT. The goal of this phase was to help students become sensitized to prosodic patterns in various contexts. Students were asked to listen to a conversation while shadowing it: while students listened, they would repeat what they heard simultaneously as accurately as possible (Hamada, 2016). In this way, the students could familiarize themselves with the speed rate for better comprehension. Most importantly, shadowing can help students strengthen their phonological working memory capacity (Hamada, 2016). Students had to make an audio recording of their shadowing and upload it to the website. They could repeat the task as many times as they wished until they decided to submit the recording.

Phase 3: SWALLOW IT. The goal of this phase was to let students practice constructing meanings using their prior experience and knowledge while listening to a conversation. They were asked to write down the main ideas and all details that they could hear while listening to the conversation. They could replay the audio as many times as they wanted. After clicking the Submit button, the transcript of the audio was displayed for their self-evaluation.

Instruments

The measurement of listening comprehension

The participants' listening comprehension was measured by the listening component of the DIALANG test. The reasons for choosing this test were three-fold. First, this online language testing system is free of charge and not a high-stakes test (Alderson, 2005). Second, it is based on the levels of the Common European Framework of Reference for Languages (CEFR) which is an international standard for describing language ability. Third, its validity and reliability have been verified after a rigorous process of standard-setting by its developers and the CEFR. There were 30 items, which were dialogue-type and monologue-type discourses including three types of tasks: multiple-choice, short answer, and gap-fill (drop-down or text-entry). The test covered three aspects of listening: listening for detail, identifying main ideas, and inferencing. The students could hear each clip only once.

Written journals

Once a week, students were asked to write down and record their reflections in their L1 while working with the *Listening Vitamins Course* by answering four questions designed to focus on their listening progress as well as on their experiences. Students self-evaluated their listening performance, expressed their opinions on the listening activities, their feelings as well as any difficulties they might encounter. In this way, the students became more involved in their learning by self-monitoring their listening improvement.

Semi-structured interview

A semi-structured interview was conducted at the end of the course with ten students to get more insights into their feelings and thoughts about the listening environment that they had been involved in. The interview consisted of five questions and each lasted about five minutes (see Appendix A).

Data analysis

For the listening test scores, t-tests were run (using SPSS 17) to decide on the effect of the intervention on the improvement of the students' listening comprehension. For qualitative data from journals and interviews, content analysis based on five procedures proposed by Creswell (2009) was used to code and interpret the data.

Results

The first question in the study sought to determine whether learners improved their listening comprehension after receiving prosody-based practice in a computer-assisted self-regulated listening environment. Paired t-tests were conducted to determine whether there were any significant differences between the posttests and pretests within each group. As shown in Table 2, significant differences were found across both groups. The students in the experimental group achieved significantly higher scores in the listening posttest (M=11.3, SD=3.03) than those in the listening pretest (M=8.4, SD=2.44), t (34)=-9.56,p=.000<.05. Similarly, the scores of the listening posttest of the control group (M=9.3, SD=1.89) were significantly better than those in the pretest (M=7.9, SD=1.67), t (29)=-5.89, p=.000<.05.

When the mean differences were examined, the experimental group (MD=2.9) was found to have made much greater improvement than the control group (MD=1.4). The improvement ratio of the experimental group over the control group was of the order of 207%. In other words, students in the experimental group improved twice as much as students in the control group. Moreover, the results of independent sample t-tests shown in Table 3 indicate that no significant difference was found between the listening scores in the pretest between the two groups, t (63)=0.95, p=.347>.05 while there was a statistically significant difference in the listening posttests between the two groups, t (63)=3.19, p=.002<.05. The value of Cohen's d effect size was 0.817, indicating a large effect size. In other words, the size of the differences in the listening improvement between the two groups was large.

Altogether, these results suggest that despite listening improvement in both groups after the listening course, the students involved in the prosody-driven practice in a computer-assisted self-regulated listening platform performed significantly better in their listening test than those who were taught listening traditionally.

Table 2
Within-group Mean Difference between pretest and posttest for the two groups

Scores	T-test					
	Mean	*SD*	*Mean Difference*	*df*	*t*	*Sig. (2-tailed)*
Pretest-CG	7.90	1.668	1.40	29	-5.887	.000*
Posttest-CG	9.30	1.896				
Pretest-EG	8.40	2.439	2.94	34	-9.597	.000*
Posttest-EG	11.34	3.029				

*p< .05 level

Table 3
Between-group Mean Difference for pretest and posttest

					95% Confidence Interval	
	SE Difference	*df*	*t*	*Sig. (2-tailed)*	*Lower*	*Upper*
Pretest	.527	63	0.948	.347	-.554	1.554
Posttest	.639	63	3.194	.002*	-.765	3.321

*p< .05 level

In response to the second research question, which was to explore learners' opinions about the self-regulated listening environment, the students generally had positive comments on the listening practice that they had been involved in and expressed their preference for this teaching approach to the traditional one. The students' written reflections showed their awareness of their listening progress and their gain in confidence in their listening. Data analysis from students' journals and interviews revealed that students believed that it was the self-paced listening, the repetitive practice, the intensive exposure to natural speech, and their increased vocabulary knowledge that contributed to their listening improvement, as displayed in Table 4.

Table 4

Sample extracts of opinions from students' written journals about the listening practice.

Excerpt from students' journals	Suggested English translation
babydoll@gmail.com	
Em được luyện nghe nhiều hơn và biết thêm được nhiều từ mới lúc em dịch đoạn văn.	I had more listening practice and could learn new words when I checked the transcript right away.
happyland@gmail.com	
Nó cải thiện nghe, cho em nghe được ngữ điệu thế nào và nghe cả nhiều lần.	It helped me listen better because it gave me more chance to focus on the melody of the speech and listen many times.
moonlight@gmail.com	
Phương pháp này giúp cải thiện kỹ năng nghe vì được nghe nhiều, không phải nghe chung với các bạn trong lớp,có thể tập trung hơn.	This method helped me improve my listening because of a lot of repetitive listening and self-paced listening; I did not have to listen with my friends, and I could focus more.

In all cases, the students reported that they were in favor of this listening approach because it was more appropriate and more helpful than the traditional listening method. For instance, as one student put it:

> I think this method is better than the traditional method. Normally, the time for listening activities in class is not much. I have to listen at the same time with my friends and the teacher often plays the recordings. But in this course, I could listen by myself at my own pace and I could focus more. I had more chances to listen. I was less dependent on my teacher and friends.

Most importantly, the students all agreed that they became more autonomous and took more responsibility in their listening practice because they only needed to follow the protocol on the website. As illustrated in some students' answers in their interview:

> I feel that I was more autonomous because I did not depend on the teacher too much. I had my own space to concentrate on my listening.
> I think I had an opportunity to develop my learning autonomy because I could do the tasks without the teacher. I just followed the procedures on the website. All were set and what I needed to do was to click the mouse and the audio was played.

They might resort to obtaining the teacher's assistance but most of the time, they managed the tasks on their own and had to self-evaluate and self-monitor their performances.

Discussion

Regarding research question one, whether the prosody-based practice in a self-regulated listening environment results in improvements in learners' listening comprehension, the findings indicate that the students in the experimental group significantly outperformed the students in the control group regarding their listening scores. There are several possible explanations for this result.

First, students' listening improvement can be attributed to their exposure to prosodic patterns through sensitization and internalization. This is consistent with previous studies by Han (1996), Kettongma and Wasuntarasobhit (2015), and Huang (2009) demonstrating that prosody plays a vital role in understanding spoken language. If the students become familiar with prosodic features of the target language, they become more sensitive to the melody of the utterances and can follow the speech despite the fast speed.

Second, it seems possible that students' listening comprehension improved because their automaticity was strengthened. By producing gestures while repeating, students appeared to establish their self-synchrony in English. Simply put, the coordination between speech and gestures helped students internalize the prosody into their body memory successfully (Chan, 2018). Besides, students were likely to develop their automaticity thanks to the shadowing tasks (Hamada, 2017). Shadowing required students to process what was heard and immediately verbalize it again without much chance for translating online. This helped to stimulate and shape their inner speech (Guerrero, 2005). For novice L2 learners, due to their limited memory capacity, they mainly relied on controlled processing during the listening process, which often interfered with their meaning-making process (Vandergrift, 2011). For this reason, once the automatic processing was enhanced, more attention could be drawn to the process of constructing meaning to achieve effective comprehension.

Third, it is probable that the method used in the present study had a bearing on the students at a perceptual level. It is likely that listening to low-pass filtered recordings bypassed their normal processing mechanism and triggered the right hemisphere (Meyer et al., 2004). In this way, students seemed to successfully internalize the prosodic patterns of the target language. As a result, their old L1 listening habits may have been adjusted or modified to some extent, resulting in their adoption of new L2 listening habits. This, in turn, may lead to their L2 listening improvement.

Lastly, there is a possibility that it is the self-regulated listening environment per se that offered them the right conditions for their listening practice, and which leads to better performance. As in Pintrich's (1995) description of self-regulated learning, the students are in control of the available resources such as their time, their study environment, etc. They also have a specific goal in mind to make their progress. Also, they are the ones who control their learning process: their self-monitoring, self-evaluation, and self-reflection enable them to figure out effective strategies for their learning. In other

words, as Schunk (2005) put it, in a self-regulated learning environment, listeners become active and constructive learners rather than passive recipients. In this respect, it seems to reflect the nature of the listening process in which listeners bring their personal experience and knowledge to construct their meaning (Vogely, 1988). In this respect, learning may take place because listeners' meaning-making mechanism is respected and they have the opportunities to challenge the act of comprehension by confronting, contrasting, and contesting their understanding against the aural signals they perceive (Lian, 2004).

Taken all together, these factors may explain the improvement of students' listening comprehension after the experiment, but it is unclear which had the most decisive impact. However, it is certainly the blend of the mentioned techniques in the approach that contributed to the students' listening improvement. The important point is that these techniques are related in some way and they interact with and complement one another to achieve the best outcome.

Regarding the second research question concerning learners' opinions about the self-regulated listening environment in the study, qualitative data analysis reveals that the overall opinions were positive. The students reported that they had had a nice experience practicing their listening with the self-access listening website. As all the participants admitted, they believed that their listening ability had improved thanks to the intervention.

These students appeared to concur with the idea that this approach enabled them to have their personal space for listening at their own pace. They contrasted this learning mode with their normal classes by stating that there were fewer distractions and less dependence on the teachers or their peers together with greater efficiency and effectiveness. According to Field (2009), practicing listening in a whole-class context is ineffective since the nature of listening is personal, internalized, and time-constrained. The more engagement the students have in the tasks, the more chance learning can happen. Recall tasks on the listening website gave the students a chance to reconstruct what they could hear in their ways. They had a chance to actively structure their understanding as well as evaluate their work by comparing their answers with the provided transcripts.

Besides, they stressed that the repetitive practice contributed to the improvement. This may be explained by the fact that the time spent on listening in traditional classes did not give them enough exposure to the aural input. The high frequency of repetition with a focus on the prosody seems to increase their sensitivity to the English accent or features of spoken language. As Lynch and Mendelsohn (2010) stated, repetition is considered as a well-beaten path to fluency development. In this case, persistent exposure may lead to the enhancement of learners' automaticity in listening. This explains why the students reported that gradually they became familiar with the fast speech and felt more comfortable with their listening.

Additionally, students also said that their gain in new vocabulary knowledge contributed to their listening improvement. A possible explanation for this is that they may have picked up new vocabulary incidentally. Laufer (2010) refers to this phenomenon as incidental learning, which takes place while improving other language skills. Moreover, listening is considered as a source of meaning-focused input, as stated by Nation and Meara (2010). Therefore, high involvement and full attention during listening activities might enable vocabulary learning to happen.

Furthermore, the participants all demonstrated that this self-regulated listening environment helped them to promote their learning autonomy. They expressed that the absence of the teacher enabled them to take charge of their learning. As Benson and

Voller (1997) put it, self-access resources do not automatically guarantee that learners will become more responsible for their learning; therefore, materials should be designed in a way that can support them and foster their independence. Although the self-regulated listening environment in the study gave the students more choices and freedom, the tasks were built on a protocol based on pedagogical principles and within learners' abilities. Moreover, the students said that they felt more motivated and less anxious while listening. This echoes the findings of Wang and Zhan (2020) suggesting greater motivation and less anxiety are beneficial to learners' online self-regulated learning. In general, the students seemed to know how to make the most of the provided resources to facilitate their learning as a way to exercise their learning autonomy.

Conclusion and Implications

This study set out to investigate the effect of prosody-based practice in a self-regulated listening environment on EFL learners' listening comprehension and to explore their opinions about this listening platform. The findings demonstrate that after 10-week practice in a self-regulated listening environment with a focus on prosody, students had made significant improvement in their listening comprehension. This means that the listening approach used in this study had succeeded in providing learners with a multi-channel perceptual experience and, in turn, helped them to modify their auditory perception for more effective listening comprehension. The results underline the value of prioritizing prosody by using low-pass filtered audio, repetition in synchrony with body movements, and shadowing in developing listening comprehension. The findings also highlight the indispensable role of CALL in offering learners a self-managed learning system where they could develop self-regulatory skills to become effective listeners. Besides, features of the listening website such as optimal exposure to authentic spoken speech together with self-paced and autonomous listening received positive comments and great favor from students.

However, these results need to be interpreted with caution when being applied to students at different proficiency levels in different contexts. The participants in this study were Vietnamese EFL first-year students at the A1 level. Further research can be undertaken to see how effective this approach is in the case of intermediate and advanced learners in another context. Besides, despite the positive and profound impact of this listening approach on learners' listening comprehension, it is impossible to identify the decisive factor responsible for the improvement: it is the ensemble of activities that proved effective. Therefore, future work can be done by separating the variables to determine how each contributes to this improvement.

Considering the results, there are some significant pedagogical implications. First, the fact that the listening approach in this study had a positive and profound impact on learners' listening comprehension raises the possibility that teachers should be recommended to implement this approach in the teaching of listening. Research using this approach should be encouraged to see what will happen and whether the results are replicable or not. Under another circumstance, teachers should stress the importance of prosody and try to use the techniques such as listening to low-pass filtered audio, synchronizing body movement with speech, and shadowing in their teaching. For a bigger picture, during teacher training, awareness should be raised to the significance of the

mentioned techniques in this study. Besides, recognition should be given to the value of work on prosody based on repetition coordinated with body movements and shadowing in language learning and teaching by policymakers. Finally, the interdisciplinary perspective of this study should be underlined in order to have a better understanding of the learning process and to offer the most appropriate approach.

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APPENDIX A

Questions for interview

1. What do you think of the listening approach that you were involved in?
2. In your opinion, what is the effect of the approach on your listening skills?
3. What do you think about this approach compared to the traditional way that you often study listening in your class?
4. What do you think if this approach will be applied in the listening course at your college?
5. In your opinion, did this approach help you to promote your learning autonomy? Why?
6. Did you have any problems when you were taking the Vitamins course? If yes, what problems did you have?
7. Do you have any suggestions to improve the implementation of the listening approach based on your experience with the Vitamin course?