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EXPLICIT TEACHING OF SEGMENTALS VERSUS SUPRASEGMENTALS: WHICH WOULD YIELD BETTER LISTENING COMPREHENSION SKILLS FOR INTERPRETER TRAINEES? AN EXPERIMENTAL STUDY

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ABSTRACT: *The present study investigates the effect of explicit teaching of segmentals and suprasegmentals on developing listening comprehension skills for Farsi-English interpreter trainees. Three groups of student interpreters were formed. All were native speakers of Farsi who studied English translation and interpreting at the BA level at the University of Applied Sciences in Tehran, Iran. Participants were assigned to groups at random, but with equal division between genders (6 female and 6 male students in each group). No significant differences in English language skills (TOEFL scores) could be established between the groups prior to the experiment. Participants took a pretest of listening comprehension before starting the program. The control group listened to authentic audio tracks in English and discussed their contents, watched authentic English movies, discussed issues in the movies in pairs in the classroom. The first experimental group spent part of the time on theoretical explanation of, and practical exercises with, English suprasegmentals. The second experimental group spent part of the time on theoretical explanation of, and practical exercises with, English segmentals. The total instruction time was the same for all three groups, i.e. 12 hours. Students then took a posttest in listening comprehension skills. The results show that the explicit teaching of segmentals significantly improved the students' listening comprehension skills more than that of the other groups. These results have pedagogical implications for curriculum designers, interpreting programs for training future interpreters, material producers and all who are involved in language study and pedagogy.*

KEYWORDS: Listening comprehension skills, segmentals, suprasegmentsals, interpreter trainees, curriculum design

INTRODUCTION

Listening comprehension skills enable foreign-language learners to perceive language input and facilitates the emergence of other language skills (Vandergrift & Goh 2012). Listening

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comprehension involves complicated skills which range from perception to comprehension and require the interaction between top-down and bottom up cognitive processes, which, in turn, are mediated by attention and memory mechanisms. Generally, listening comprehension skills are assessed rather than taught in language classrooms. Compared with writing, reading comprehension and even speaking skills, the development of listening comprehension receives the least systematic attention from instructors in different academic settings. Khaghaninejad and Maleki (2015) established that explicit phonetic instruction has positive effect on students' listening comprehension skills. They ran a study with three groups of students, i.e. one control group and two experimental groups. The first experimental group received explicit teaching of segmentals and the second experimental group received explicit instruction of suprasegmentals. The results showed that the experimental group that received explicit teaching of segmentals outperformed other groups in listening comprehension skills after the training program.

The positive effects of explicit instruction of phonological rules have been emphasized by different researchers (e.g. Leather 1990; Champagne-Muzar et al. 1993; Pennington 1998; Ahrens 2004; Derwing & Munro 2005; Venkatagiri & Levis 2007; Foote et al. 2011; Derwing et al. 2012; Robinson et al. 2012; Yenkimaleki & van Heuven 2013, 2016a,b,c,d; Suwartono 2014; Koike 2014). Ahangari et al. (2015) maintained that pronunciation teaching would significantly improve EFL students' listening comprehension skills. Derwing et al. (1998) found that speakers who had received instruction emphasizing suprasegmental features could transfer their learning to spontaneous speech production more effectively than those who received instruction with only segmental content i.e., vowels and consonants. Yenkimaleki and Van Heuven (2016a) showed that the explicit teaching of prosodic (i.e. suprasegmental) features led to a significant improvement of listening comprehension skills for interpreter trainees. They formed two groups of trainees who were native speakers of Farsi and studied English translation and interpreting at the BA level at the State University of Arak, Iran. The control group only received exercises in listening comprehension skills, while the experimental group spent part of the time on theoretical explanation of, and practical exercises with, prosodic features of English. Students then took a standard listening comprehension test. Explicit teaching of prosody led to a modest but significantly better improvement for the experimental group (by 2 points; scores ranged between 44 and 64% across both groups) on a standard listening comprehension test.

Cutler et al. (1997) reviewed the exploitation of prosodic information in the comprehension of spoken language. They looked at the use of prosody in the recognition of spoken words, in which most attention has been paid to the question of whether the prosodic structure of a word plays a role in initial activation of stored lexical representations; the use of prosody in the computation of syntactic structure, in which the resolution of global and local ambiguities has formed the

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central focus; and the role of prosody in the processing of discourse structure, in which there has been a preponderance of work on the contribution of accentuation and deaccentuation to integration of concepts with an existing discourse model. Cutler et al. (1997) explain that the task of the listener is to reconstruct the speaker's message, and that there are various different aspects to this task: recognizing the individual words, extracting their syntactic relationships, determining the semantic structure of the utterance and its relation to the discourse context. The processing of speech input is facilitated in several ways by coherent prosodic structure appropriate for sentences.

Satio et al. (2016) investigated the effects of prosody-oriented instruction on the global comprehensibility and suprasegmental development (word stress, rhythm, and intonation) of Japanese EFL learners. Students in the experimental group received a total of three hours of instruction over six weeks, while those in the control group were provided with meaning-oriented instruction without any focus on suprasegmentals. Speech samples elicited through reading-aloud tasks were assessed via native-speaking listeners' intuitive judgments and acoustic analyses. Overall, the pre-/post-test data showed significant gains in overall comprehensibility, and use of word stress, rhythm, and intonation of the experimental group in both trained and untrained lexical contexts. In particular, by virtue of explicitly addressing first language / second language linguistic differences, the instruction was able to help learners mark stressed syllables with longer and clearer vowels, reduce vowels in unstressed syllables, and use appropriate intonation patterns for *yes*/*no* and *wh*-questions.

Van Heuven (2008) argues that prosody is largely redundant in connected speech and is only used when the segmental information is faulty or unreliable. Non-native speech is characterized by unreliable segmental information when heard by native listeners, or non-natives who do not have the same native-language background as the speaker, in which case word prosody assumes a role of crucial importance. He maintains that when "communication suffers from noise, prosody fulfills the role of a safety catch" (p: 56). Wang et al. (2011), and earlier Nooteboom and Doodeman (1984), reiterate this perspective. They showed experimentally that the role of prosody becomes evident when the segmental speech quality is degraded as a result of foreign accent, noise or electronic distortion.

Therefore, considering the contradictory results in recent studies on effectiveness of teaching prosodic features to EFL learners and also the effectiveness of explicit teaching of segmentals by some scholars we need to investigate this domain systematically in wider contexts with different participants. Given that foreign-language curricula (including training programs for interpreters) have to make strict choices as to how much time should be spent on teaching particular skills, it

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is important to know whether teaching time is better spent on segmentals or on prosody. The results of such studies can be incorporated in interpreter training programs for training the next generation of interpreters. Therefore, we concretely asked the following research question:

Which one of two areas of explicit teaching yields better listening comprehension skills for Farsi-English interpreter trainees: segmental structures or suprasegmental structure?

At this stage we prefer not to derive specific hypotheses as to which of the two areas will be more important. This will depend on the similarities and differences between the phonological systems (and their phonetic implementation) of L1 and L2. In the case of EFL for native speakers of Farsi the segmental inventories (large in English, restricted in Farsi) and syllable structures (complex in English, simple CV in Farsi) differ substantially between the two languages, but so do word stress (complex and weight sensitive in English, fixed final in the vast majority of the vocabulary in Farsi) and rhythmic structure (stress timing in English versus syllable timing in Farsi).

METHODOLOGY

Participants

Thirty-six student interpreter trainees at the BA level who were majoring in interpreting and translation studies at University of Applied Sciences in Tehran, Iran, were chosen randomly to participate in this study. They were randomly divided into three classes of 12 students that each incorporated 6 male and 6 female students. The participants were native speakers of Farsi within an age range of 20-24 years. They participated in all sessions of the training program.

Procedure

Participants were divided into one control group and two experimental groups through the application of systematic random sampling. The control group received routine exercises, asking them to listen to authentic audio tracks in English and speaking about the issues brought up in the audio tracks. They also watched authentic movies and discussed the contents of the movie in class. The first experimental group spent less time on these tasks and instead received awareness training of English prosody in the form of theoretical explanation by the instructor and practical exercises in prosody (word stress, rhythm, intonation) for 20 minutes during each training session. The second experimental group received explicit teaching of segmentals (vowels, consonants, syllable structure) for 20 minutes during each training session. The participants took part in the program for 12 sessions (sixty minutes per session) during four weeks, i.e. 12 hours in all.

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At the beginning of the program all the participants took a pretest of general English proficiency. The test battery was the standard Longman's TOEFL English proficiency test, with separate modules testing the learner's (i) Listening comprehension, (ii) Reading comprehension and (iii) Structure and writing skills. Then, the control group and experimental groups took a pretest of speaking so that their basic level of speaking skill could be assessed before they received any type of training.

Altogether the control group listened to 540 minutes of authentic audio tracks and did the exercises based on them. Moreover, the control group and the two experimental groups listened during 180 minutes to the Iranian instructor who explained how to do exercises in listening comprehension. The experimental groups altogether listened for 300 minutes to authentic audio tracks and did the exercises based on them. The first experimental group listened for 120 minutes to the theoretical explanation of English prosody that was provided by the Iranian instructor and spent 120 minutes in all doing practical exercises in English prosody (see Yenkimaleki 2016 for detailed training program). The second experimental group listened for 120 minutes to the theoretical explanation of English segmentals that was provided by first author and 120 minutes in all doing practical exercises in English segmentals. The activities covered by the three participant groups and the time (minutes) spent on them are summarized in table 1.

Table 1 Summary of activities and time spent (minutes) by three groups of participants in experiment.

Activity	Group		
	Control	Prosody	Segments
Audio tracks/ movies & discussion	540	300	300
Listening Comprehension exercises	180	180	180
Prosodic theory		120	
Prosodic practice		120	
Segmental theory			120
Segmental practice			120
Total time spent	720	720	720

In all the sessions, at different times, formative tests were administered to the participants in order to measure their progress and to diagnose problems on the part of the participants. Both at the beginning and at the end of the program, standard Longman's TOEFL listening

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comprehension test modules were administered as pretest and as posttest to evaluate global listening comprehension for both groups. Both pretest and posttest had 50 multiple-choice items with four alternatives per item. The participants listened to a conversation or description of some phenomenon and, based on that, chose one option from four choices. These standardized pretest and posttest have the same level of difficulty as claimed by the documentation that goes with these standard tests.

RESULTS

At the beginning of the program all the participants took of the TOEFL test (see above) of general English proficiency so that we can see whether the participants form a homogeneous group or not. Table 2 shows the participants' overall mean scores and their SD.

Table 2 Overall mean score and SD on TOEFL proficiency test for control group and experimental groups (N = 12 per group).

	Control group	Prosody group	Segmental group
Mean	534.12	541.66	536.08
SD	27.05	33.61	25.10

A oneway Analysis of Variance (ANOVA) for unrelated samples shows that the effect of group is insignificant, $F(2, 33) = 0.221$ ($p = 0.882$). The conclusion follows that the three groups were equivalent in terms of English proficiency at the start of the experiment.

Before starting the awareness training program, a standard pretest of listening comprehension skills was run to investigate the participants' listening comprehension skills. Table 3 lists the mean scores of listening comprehension skills and their SD for pretest.

Table 3 Mean and SD of listening comprehension scores for different groups in pretest (on a scale between 0 and 50).

	Control group	Prosody group	Segmental group
Mean	35.91	36.41	35.16
SD	6.63	7.31	6.83

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The score differences between the three groups are within one point on the scale from 0 to 50. None reach statistical significance as determined by a oneway Repeated Measures Analysis of Variance (RM ANOVA, with Huyhn-Feldt correction for violation of sphericity requirement) with participants matched across groups on the basis of their TOEFL scores, $F(1.5, 16.3) = 3.3$ ($p = 0.075$, $p\eta^2 = 0.230$). This confirms that the three groups were not statistically different in terms of listening comprehension skills at the start of the intervention.

At the end of the training program, a standard posttest of listening comprehension skills (a different version of Longman's Listening comprehension test) was run to assess the effect of the treatments. The pretest and posttest had the same level of difficulty as stated by Longman TOEFL Company. The mean scores and the SDs are presented in Table 4, for control group and experimental groups separately.

Table 4 Mean and SD of listening comprehension scores for different groups in posttest (ratings are between 0 and 50).

	Control group	Prosody group	Segmental group
Mean	36.41	39.91	42.25
SD	6.85	7.40	6.41

This time the RM ANOVA shows that the effect of group is highly significant, $F(2, 22) = 44.5$ ($p < .001$, $p\eta^2 = 0.802$). Each of the three groups differed significantly from the other two (Bonferroni post hoc tests with $\alpha = 0.05$).

In order to compare the results of the control group and the two experimental groups and to know whether the difference in the means truly stems from the type of the treatment for developing listening comprehension skills in different groups, a oneway ANOVA was performed on the individual participants' gain between pretest and posttest. Ideally, for this test, the subjects should be randomly assigned to three groups, so that any difference in response is due to the treatment and not to other factors, which conditions were clearly met in the present case. Table 5 illustrates the gain, i.e. the difference between the posttest and the pretest scores.

ISSN 2055-6063(Print), ISSN 2055-6071(Online)

Table 5 Pretest and posttest mean scores and the gain for training program in listening comprehension skills calculated for different groups separately.

Control group			Prosody group			Segmental group		
Pretest	Posttest	Gain	Pretest	Posttest	Gain	Pretest	Posttest	Gain
35.91	36.41	0.5	36.41	39.91	3.5	35.16	42.25	7.09

Table 5 shows that explicit teaching of segmentals was more effective in improving the listening compression skills of interpreter trainees compared with the explicit teaching of suprasegmentals. An RM ANOVA run an the gain obtained by the three groups shown that the overall effect is significant, $F(1.8, 19.6) = 63.3$ ($p < 0.001$, $p\eta^2 = .852$). Moreover, the gain for the segmental group was significantly larger than that obtained by the prosody group (Bonferroni post hoc tests).

CONCLUSION

The present study investigated the effect of explicit teaching of segmentals versus suprasegmentals on developing listening comprehension for Farsi-English interpreter trainees. The results show, first of all, that both the explicit teaching of prosody and of segmentals significantly improved the students' listening comprehension skill. Secondly, explicit teaching of segmental properties of English yields significantly better listening comprehension than devoting the same amount of time to the teaching of prosodic characteristics of English.

The results of the study converge with Khaghaninejad and Maleki (2015) who stated that explicit teaching of segmentals significantly improves the listening comprehension skills of EFL learners. The results of the study also confirm our earlier experience that explicit teaching suprasegmentals enhances interpreter trainees' listening comprehension. This perspective is in line with Yenkimaleki and Van Heuven (2016a,b,c,d) who maintained that explicit teaching of prosodic features would have statistically significant effect on interpreter trainees perception and production quality of speech in interpretation performance. This finding also supports Cutler et al. (1997) and Epstein (1961) who suggest that the prosodic structure of an utterance plays an organizing role in speech recognition.

What is new in the present study is that, in the given circumstances where only limited curricular time is available for instruction (whether implicit or explicit) and practice, a well motivated

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choice can be made to lend priority to the explicit teaching and practice of segmental properties of the target language, rather than to the teaching of suprasegmental (prosodic) properties. As explained in the introduction, words are recognized primarily on the basis of segmental information, i.e. the defining phonetic properties of vowels and consonants in the early-to-late arrangement in which they are sequenced by the speaker. In the present experiment, the stimulus materials were produced by native speakers of (British) English so that the both the segmental and the suprasegmental properties of the utterances were perfect by definition. In such conditions, prosody is largely redundant vis-à-vis the segmental information (this is also why segmental rather than prosodic information is primarily reflected in written English, see Van Heuven 2008, 2017). It makes eminent sense, therefore, that better knowledge of (or familiarity with) the segmental properties of the input language makes a larger contribution to listening comprehension than similar knowledge of only the redundant phonetic properties of the language. It has amply been shown that no words can be recognized from prosody alone: only the properties of larger prosodic domains (such as phrase boundaries cueing syntactic structure) were found to be preserved in low-pass filtered or spectrally rotated/scrambled English speech (e.g. Blesser 1969; Lindblom & Svensson 1973; Svensson 1974).

This, of course, does not automatically mean that no attention should be paid at all to prosody. Our results do show a significant contribution of prosody teaching to the development of listening skills. So future studies should be done in finding the optimal division of labour to be spent on the teaching of segmental versus suprasegmental phonetics in the (English-into-Iranian) interpreter training curriculum: how much time and effort should be allocated to each of these aspect and how should the activities be ordered?

The pedagogical implications of this study would pertain to interpreting programs all over the world. Educational policy makers, curriculum developers, practitioners, and administrators need to make a number of changes in their overall approach to the teaching phonetics as part of interpreter training programs. Producers of teaching materials for such programs should be in contact with researchers in the field of phonetics, take publications of phonetics into consideration and include methodological issues of segmental and suprasegmental teaching in the textbooks for interpreting programs.

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