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An Auditory Perspective to How Phonetic Training Affects Listening

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Abstract. In second language acquisition, listening plays a fundamental role for it functions as an important source of message input. Cognitive linguists advocate that effective comprehension of listening requires the activation of schematic knowledge in listener's brain. While many researchers have studied how second language learners use their background knowledge and global understanding to derive meaning from and interpret message, it is rarely studied that listening is also a process of sound decoding from phoneme to the complete text. Auditory phonetics believes this decoding starts from sound discrimination which occurs in human ears and stimulates the auditory nerves to decode the sounds in the brain. This study investigates this sound decoding process in listening comprehension by conducting an experiment on college English learners. The result of the experiment shows that English pronunciation and listening are correlated and subjects receiving phonetic training improve their listening comprehension. These findings inspire college English teachers to innovate novel teaching methods by combining phonetic teaching with listening teaching.

Introduction

Listening plays a vital role in foreign or second language acquisition. It is an important source of information input to the learners. Without understanding input at the right level, any learning simply cannot begin. In years of English learning and teaching, the author realizes that an English learner who has pronunciation deficiency at certain English sounds usually get blocked by these sounds in the process of listening. Chinese students understand their Chinese English teachers much better than the native English speakers. These phenomena inspire the author to reflect on whether they are coincidences or they help to reveal a rule between English phonetics and listening. Conducting an experiment on the college English learners, the present study investigates how phonetic features of English learners affect their listening and whether phonetic training is an effective way to promote their listening comprehension.

Literary review

Krashen (2003) argues that people acquire language by understanding linguistic information they hear. Cognitive linguists believe that the effective comprehension of a text, in both form of listening or reading, requires the activation of schematic knowledge. Schematic knowledge or prior knowledge, according to Hedge (2002), consists of the mental framework we hold in our memories for various topics. It involves how we use our schemata (background knowledge and global understanding) to derive meaning from and interpret message.

A clear description of how listening comprehension is achieved by non-native English listeners is a combination of two processes. One process is the function of schematic knowledge. It is about how we use our world knowledge to attribute meaning to the English input in listening and how our social convention helps to understand meaning. In college listening teaching, many teachers and scholars are concerned this process and study the schema theory and how important to supplement the background knowledge to students (Wang Jianying, 2015; Ma Min &Zhang Zhao, 2011; Sun Weiqi 2018; Chen Fang, 2018; Judith F. Feldman , Jeffery J. Jankowski, 2003) and train the English learners strategies in listening process to in order to improve their listening (Lou Heying, 2004; Yu Jun 2013; Li Danyang,

2017; Irene Thompson, 2008; Larry Vandergrift, 2013; Farinaz Bidabadi, Hamidah Yamat, 2011). These studies and teachings mainly concern the non-linguistic factors such as the skill of predicting, inferring, emotion control, related background knowledge supplementing, and the like, which serve as an assisting and complementary peripheral part of listening comprehension rather than touching the essence of it.

Listening is also a process of decoding the sounds from phoneme, the smallest meaning unit to the complete text. The decoding is, according to auditory phonetics, a process of sound discrimination which occurs in "listening trail" in human ears and stimulates the auditory nerves to decode the sounds in the brain by the "language decoding mechanism" to achieve comprehension. The decoding involves how sounds link together to form a word, and words are linked together to form a phrase, and phrases to a sentence, and sentences to a discourse. This process is less studied than the schematic process in English teaching and research field. Knowing the phonetic features of the foreign language is vitally necessary for learners to understand it through listening (Lagefoged, 2001). To teach college students how sounds string together and change in different ways have an important effect on their listening. This paper combines phonetics and listening in order to show how phonetic training affects their listening comprehension.

Methodology

Subjects: Sixty college students were randomly chosen among freshmen in Public Management Department in Shandong University of Political Science and Law, thirty being girl students and thirty boy students. All the subjects come from districts or counties in Shandong Province, ranging in age from seventeen to nineteen with similar high school education background before college. Subjects were encoded one to sixty and divided equally into two groups, an experimental group and a control group, with fifteen girls and fifteen boys in each group.

Tools: a computer with the data processing software SPSS 20.0; Listening parts of Public English Test level three in March and September in 2018; two phonetic tests designed by the author (the pronunciation test is composed of four parts of international symbol pronunciation, word pronunciation, sentence and passage reading).

Procedures: Firstly, we arranged an English phonetic test in the language lab for the subjects. Sixty audio files were collected. The next day we tested them English listening and sixty answer sheets were collected. All audio files and answer sheets were scored afterwards. When the four-week experiment was fulfilled, phonetic and listening was retested with the same difficulty degree and question types. Sixty phonetic audio files and sixty listening answer sheets were collected and scored according to the same score attribution criteria. Finally, all the scores were categorized and marked as P1 (phonetic scores of control group before the experiment), L1 (listening scores of control group before the experiment), P2 (phonetic scores of experimental group before the experiment), L2 (listening scores of experimental group before the experiment), P3 (phonetic scores of control group after the experiment), L3 (listening scores of control group after the experiment), P4 (phonetic scores of experimental group after the experiment), and L4 (phonetic score of experimental group after the experiment).

Treatments: Auditory phonetic theory classifies the perception process into four stages as being auditory, pronunciation, phoneme system and grammatical structure. Basing on this classification, the experiment of phonetic training was designed into four steps of four weeks, two hours each from Monday to Friday. The first week dealt with the international symbols, the second week the intra-lingual phone training, including weakening, liaison, stress, and the like; the third week dealt with intra-syntax phoneme relationship, like tone, rhythm, pause, pitch, and so on; the last week training was text reading training, including story, essay, speech, and news. Training materials were developed basing on the book *An English Phonetics and Phonology: A Practical Course* by Peter Roach (2001). In contrast, the subjects in control group continued their regular listening classes during the four weeks and no other treatment was executed on them.

Result: To begin with, the reliability and validity of the self-designed phonetic test papers were analyzed. Pre-PTP stands for the phonetic test paper employed before the phonetic training experiment and Post-PTP refers to the phonetic test paper after the experiment. The result is shown in table1.

Table 1. Reliability and Validity Analysis of the Phonetic Test Papers.

	Cronbach Alpha	Kmo	Bartlett's Sig.
Pre-PTP	.902*	.691*	.000*
Post-PTP	.895*	.725*	.000*

Note: * Bartlett's is significant at the 0.001 level (2-tailed)

As table1 shows, for the two phonetic test papers, the two Cronbach Alpha values are close to 1 and above 0.5. They are both in the range of reliability; the Kmo values are both above 0.5 and P values are both 0.000, below 0.001, which suggests that the validity of the two phonetic test papers meet the need of requirement for further analysis.

When all tests finished and scored, the data was input to the statistical processing software SPSS 20.0. The bivariate correlation analyses were conducted between the phonetic and listening scores of the two groups. The result is shown in table2 and table3.

Table 2. Bivariate Correlation Coefficients between Phonetic and Listening Scores in Control Group.

		P1	L1
P1	Pearson correlation	1	.819*
	Sig. (2-tailed)		.000
	N	30	
L1	Pearson correlation	.819*	1
	Sig. (2-tailed)	.000	
	N		30

Note: * Correlation is significant at the 0.001 level (2-tailed)

Table 3. Bivariate Correlation Coefficients between Phonetic and Listening Scores in Experimental Group.

		P1	L1
P2	Pearson correlation	1	.801*
	Sig. (2-tailed)		.000
	N	30	
L2	Pearson correlation	.801*	1
	Sig. (2-tailed)	.000	
	N		30

Note: * Correlation is significant at the 0.001 level (2-tailed)

Table2 and table3 shows the phonetic and listening scores in the two groups before the experiment. Pearson correlation coefficient "r" in each table is 0.819 and 0.801 respectively, and P in each table equals 0.00, below 0.001, which suggests the phonetic and listening test scores of the subjects are significantly correlated.

Nine subjects whose English scores in the National College Entrance Examination ranged from 125 to 135 were sampled and their English phonetic scores and listening scores in this study were chosen to conduct a partial correlation analysis. The result is shown in table4.

Table 4. Partial Correlation Coefficients of English Pronunciation and Listening (with English proficiency as the control variable).

		P1	L1
P1	Pearson correlation	1	.705*
	Sig. (2-tailed)		.000
	N	9	
L1	Pearson correlation	.705*	1
	Sig. (2-tailed)	.000	
	N		9

Note: * Correlation is significant at the 0.001 level (2-tailed)

In table4, the Pearson correlation coefficient r is 0.705, and the value of P is zero, below 0.001, which indicates that when the variable of English proficiency is controlled, the two variables of pronunciation scores and listening scores are also significantly correlated.

When the four week experiment finished, we retested all subjects about their phonetic and listening abilities with the same question types, difficulty degree and grading criteria as the test before the experiment. T-test was conducted to analyze whether there is significant difference between the phonetic and listening scores of the two groups before and after the experiment. It is to prove whether the phonetic training is effective or not and how it dynamically affects the listening ability of the subjects.

Table 5. Independent-sample T Test of Phonetic and Listening Scores between the Two Groups before and after the Experiment.

Project *	Mean Difference	t	df	Sig.(2-tailed)
P1&2	-.3000	-.1201**	59	.128
L1&2	-.6000	-.0067**	57.747	.059
P3&4	-7.2000	-9.183**	58	.000
L3&4	-4.5333	-8.985**	55.469	.000

Independent-sample T test compares the difference in the phonetic and listening scores between the two groups before and after the experiment.

The test shows that at the level of α=0.05, for both data of pair P1&2 and pair L1&2, the value of P equals 0.128 and 0.059, both above 0.05, which suggests the difference between the pair of P1 and P2, and L1 and L2 are of no statistical significance. This means that before the experiment, there are no significant differences between the two groups in their phonetic and listening scores. In contrast, the data in pair P3&4 and L3&4 shows that the value of P both equals 0.000, below 0.05, which means that after the experiment, the difference in phonetic scores between the two groups and the difference in listening scores between the two groups are both statistically meaningful.

Table 6. Paired-sample T Test of Phonetic and Listening Scores of the Two Groups before and after the Experiment.

Project *	Mean Difference	t	df	Sig.(2-tailed)
P1&3	-0.002	-0.183**	59	.089
L1&3	-0.005	-0.985**	57.747	.190
P2&4	-6.333	-4.349**	58	.000
L2&4	-3.400	-2.848**	55.469	.006

Paired-sample T test compares the difference of phonetic and listening scores of both groups before and after the experiment.

The values of Mean Difference of P2&4 and L2&4 are -6.333 and -3.400, which suggests both phonetic and listening scores of experimental group improve in a great margin after the experiment of

phonetic training. In contrast, data in pair P1&3 and pair L1&3 are -0.002 and -0.005 indicating that the mean scores of phonetic and listening tests in control group change slightly before and after the experiment and are of no statistical significance.

In the column of sig., the value of P in pair P1&3 and L1&3 are 0.89 and 0.190 respectively, which are both above 0.05 and confirm the suggestions shown in column of Mean Difference. The score improvement of control group is not statistically significant. Investigation to the two values reveals that 0.190 is closer to 0.05 than 0.89, indicating that compared to phonetic scores, the listening scores in control group increase after the experiment although this improvement is not as evident as to having statistical meaning.

The value of P in the pair of P2&4 and L2&4 is 0.000 and 0.006 respectively, both lower than 0.05, which suggests that the score improvement of phonetic and listening scores in experimental group is evident and statistically significant. Again it indicates that by executing phonetic training to the subjects in experimental group, their pronunciation and listening abilities both greatly improved. The P value in pair P2&4 is 0.000, closer to 0.05 than P in pair L2&4, which indicates further that the listening scores of subjects in experimental group improved significantly and their phonetic scores improved to an even greater degree.

Discussion

The result of correlation analyses and T tests shows that there is positive correlation between English pronunciation and listening and phonetic training on English learners helps to promote their listening ability. Table2 and table3 is a static analysis of the phonetic and listening score of both groups before the experiment. The values of P being zero in those analyses suggest a positive correlation between English pronunciation and listening. There are situations, however, which should be fully considered that for certain subjects, although their pronunciation scores are relatively low, they got high listening scores because they have very good overall English proficiency. Or they obtained fairly good listening scores simply because they acquire good English pronunciation although their English proficiency is relatively low. In order to exclude these exceptions, confirm the result from table2 and table3 and minimum the interference from the variable of English proficiency, we conducted a third correlation analysis the result of which is shown in table4. It suggests that when the variable of English proficiency is controlled, the value of P equals zero, which suggests the two variables of English phonetic and listening scores are significantly correlated. This implies when English proficiency of the English learners is close, the more standard an English learner pronounces, the better he or she listens.

Independent-sample T tests in table5 and paired-sample T test in table6 compare horizontally and vertically the difference in phonetic and listening scores between the two groups before and after the experiment. Table5 shows that before the experiment the pronunciation scores and listening scores of both groups are similar. After the four-week phonetic training, however, P value in pair P3&4 and pair L3&4 are both 0.00, which indicates that both pronunciation scores and listening scores increase more greatly in experiment group than in control group. This proves that the phonetic training works and promotes the listening scores of the subjects in experimental group. In contrast, for the subjects in control group who did not obtain the phonetic training, their listening scores did not show an evident increase.

Table6 compares vertically scores of the same groups before and after the experiment. The value of P in pair P1&3 and L1&3 are above 0.05, indicating that for control group, there is no significant difference in the phonetic and listening scores before and after the experiment. Their phonetic scores increase less evidently and although their listening scores increase in a small margin but it has no statistical value. In contrast, the value of P in the pair of P2&4 and L2&4 was 0.000 and 0.006, which suggests that the score improvement of phonetic and listening tests in experimental group is evident and statistically significant. The scores of experimental group increase much more greatly than that of control group and the increase of phonetic scores is more evident than the increase of listening scores.

It again confirms the result of the analysis in table5 that phonetic training to the subjects in experimental group leads to the improvement of their pronunciation and listening abilities. Or to put it in other words, phonetic training is an effective way to promote the listening ability of the subjects in the experiment group.

For the record, in table6, for experimental group, the value of P in pair P2&4, the contrast of listening scores before and after the experiment is 0.006, while the value of P in pair L2&4, the contrast of phonetic scores before and after the experiment is zero, lower than the P value in pair P2&4. This suggests that for experimental group, the change of listening scores before and after the experiment is less evident than the change of phonetic scores. The reason which accounts for this, if we review the data, is that, like experimental group, the listening scores of control group also increased, although in a small margin. This increase narrows the gap of listening scores between control group and experimental group. This implies that except for the phonetic training, there are other factors leading to this increase. Firstly, it was natural for the subjects to be less anxious in the second test compared to the first one, which would result in their better performance in the latter test. Then, while not having the four-week phonetic training, the control group, during the same time, like the experimental group, took their regular English lessons in which they improved their overall English proficiency. For instance, during this four weeks, they learned more English grammars, broadened their English vocabulary, enriched themselves with more cultural knowledge, and they practiced listening in their regular listening classes. All these learning activities improved directly and indirectly their listening ability. Therefore, phonetic training was not the mere decisive reason to account for the improvement of the listening ability of the subjects. The overall improvement of their English proficiency, their regular listening practice, their emotions and many other unknown factors affected their listening comprehension.

Conclusion

This study approaches college English listening from the perspective of auditory phonetics rather than the cognitive schema theory. Auditory phonetics believes that listening comprehension is a process of sound decoding in human brain via human ears. The experiment was designed to prove whether the teaching method of combining phonetic training with listening practice is more effective to improve the listening comprehension of English learners. The result shows that the answer is affirmative. Correlation analyses prove there is positive correlation between English pronunciation and listening, which is further confirmed when the variable of English proficiency is controlled. Both independent-sample T test and Paired-sample T test show that compared to control group, the listening scores of experimental group increase to a larger margin. This result proves that conducting phonetic training on English learners is an effective way to promote their listening comprehension. But the data also reveals that phonetic training is not the mere and decisive reason of this improvement. Factors like overall improvement of English proficiency and even emotions affect their listening comprehension. These findings have the pedagogical meaning to inspire college English teachers to innovate novel teaching approaches by combing phonetic teaching with listening teaching to improve the listening comprehension of students.

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