

An Empirical Study on the Acquisition of English Rising Tone by Chinese EFL Learners

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Abstract

Intonation is the melody and soul of speech, and plays an important role in oral communication. Nevertheless, the acquisition of English intonation by Chinese EFL learners is far from being satisfactory. It is found by empirical study that the main problems existing in acquiring English rising tone are improper placement of nucleus stress, failure to control the contour of pitch of nucleus, replacement of rising tone by falling one, epenthesis of extra central vowel after the consonant with which the nucleus or tail ends. The acquisition of rising tone is influenced by lack of intonation knowledge, poor acquisition of stress, differences between English and Chinese tone patterns, etc. One key solution is to imbue the learners with knowledge of intonation by utilizing modern phonological technologies to make possible the multimodal phonological acquisition of intonation so as to improve the learners' ability of perceiving and producing rising tone.

Keywords: Chinese EFL learners, English intonation, acquisition of rising tone, multimodal

1. Introduction

Intonation is "the melody of speech"(Wells, 2006, p. 1) and plays an important role in oral communication. It has emotional function, grammatical function, function of information structure, textual function, psychological function and indexical function (Crystal, 1997, p. 173), and is a guarantee of successful oral communication. Therefore, the acquisition of English intonation is essential for Chinese learners of English as foreign language (Chinese EFL Learners). Then, what is the status quo for the acquisition for English intonation and what are the existing problems? These questions have drawn close attention of some experts in China. Chen Hua (2006) studied the English tone patterns of 45 Chinese learners in their read English speech by method of experimental phonetics, and found that the subjects overused flat tones and falling tones, and used tones patterns at random. Zhang Jing (2012) found by research that learners did better in perceiving the falling tone than they did with the rising tone, and they did the worst with the falling-rising tone. Su Zibo and Hu Die (2011) did an empirical study on the pitch movement of words (with one syllable, two syllables and even more syllables) which appear at the end of declarative questions, taking 48 first-year English majors as subjects. Their findings are that the subjects could do properly with monosyllabic words, but they made various mistakes when uttering with rising tone disyllabic words, especially words with more than three syllables.

Undoubtedly the above studies have enhanced studies on second language acquisition of intonation and laid a firm foundation for further researches on the acquisition of intonation. Nevertheless, some defects or weaknesses still can be found. Though the above experts studied the general state of acquisition of English intonation from the perspectives of perception and production, only few focused on the acquisition of rising tone by Chinese EFL learners. And the limited studies on the acquisition of rising tone seem to be somewhat general. Since rising tone is one of the key tone patterns of English, its acquisition is of significance to Chinese EFL learners, and a close and systematic study by various methods is needed.

In view of this, this study mainly deals with the acquisition of English rising tone by Chinese EFL learners. Crystal (1976) thinks that intonation is closely related to pitch, sentence stress, rhythm and tempo of speech;

Bolinger (1989) believes that pitch is the most important element of intonation, though intonation is intimately connected with other supersegmental features. Thus, an empirical study including a survey by questionnaire and recording analysis by experimental phonetics will be conducted mainly to investigate the acquisition of rising tone by Chinese EFL learners and explore the relationship between the acquisition of English rising tone and the acquisition of stress, with the purpose of finding problems, analyzing factors involved and exploring effective ways of acquiring the rising tone so as to improve the learners' general ability of using intonation.

2. Empirical Study on the Acquisition of Rising Tone by Chinese EFL Learners

2.1 Research Design

2.1.1 Subjects

The subjects are 47 first-year English majors at the author's university, who come from all over China with different period of English learning.

2.1.2 Instruments

The study consists of two parts: survey by questionnaire and recording of read speech, through which problems concerning the perception and production of rising tone by learners are investigated and the factors influencing the acquisition rising tone are analyzed.

The questionnaire is composed of 9 questions to which multiple choices are supplied. Questions 1- 4 concern the acquisition of word stress, sentence stress, rising tone of words, rising tone of sentences, to which only one answer is requested. Questions 5-6 are about the problems existing in the utterance of rising tone, to which more than one answers can be given. Questions 7-8 are related to the general knowledge of parameters concerning the realization of stress and rising tone, to which more than one answers may be supplied. A total of 47 questionnaire were issued and collected, with 44 valid.

The content of recording falls into three parts: (1) the subjects were asked to read 8 words first with falling tone and then with rising tone. The words are: 2 mono-syllabic words (*book, long*), 2 disyllabic words (*student, ahead*), 2 trisyllabic words (*library, tomorrow*) and 2 quadrisyllabic words (*information, development*). (2) The subjects were required to read 4 general questions which end respectively with the above words with various syllables (*long, student, tomorrow, information*). The questions are: *Has he studied French very long? /Is that lady a student? / Will you be here at ten o'clock tomorrow?/ Can you give me some information?.*(3) The subjects were requested to read two dialogues (selected from *Practical American Dialogues*, by Su Yamin and S. Williams, with corresponding recording), which contain 3 general questions ended with *tomorrow, library, ahead*: *Can I set up an interview for tomorrow?/ Excuse me, do you know how to get to the library?/ Do you see that building ahead?* 44 of the subjects taking part in the survey by questionnaire were asked to read relevant materials and had their readings recorded in the language lab. The valid recordings come up to 40.

2.1.3 Collection of Data and Analysis

The statistical analysis of the questionnaires is completed by computer. The recordings are first analyzed by careful perceiving with the results fed into a computer, and then are studied by using the software *Praat*, which is often used in experimental phonetics, to examine and verify the results so as to ensure the accuracy of recording analysis. Finally, some representative clips of recordings by the subjects are taken as cases of study, compared with the corresponding recordings of read speech by native speakers. It needs to be noted that for the convenience of investigating the acquisition of rising tone, when analyzing the utterances of rising tone, we focus only on the tone falling on the nucleus and its pitch movement, without studying the general contour of the tone group.

2.2 Results and Discussion

2.2.1 Results for the Survey by Questionnaire and Discussion

Table 1. Survey Results Concerning the Acquisition of English Rising Tone (44 copies)

	excellent	good	fair	poor	awful	
1		2	26	13	3	word stress
2		1	18	21	4	sentence stress
3		1	27	13	3	word rising tone
4		2	23	19		Sentence rising tone

According to *Table 1*, learners' acquisition of word stress mainly falls into the category of *fair* (26 persons, 59.09%), and the acquisition of sentence stress by the majority is relatively *poor* (21 persons) or *awful* (4 persons), totaling 56.8%, and the acquisition of rising tone of words and sentences both belong to the category of *fair*, accounting for 61.36% (27 persons) and 52.27% (23 persons) respectively.

Besides, the statistics for the acquisition of rising tone of words are as follows (in top-down order): with no knowledge of the onset syllable for rising tone (39 persons, 88.64%), lack of practice of rising tone in senior high school (34 persons, 77.27%), inaccurate reading of word stress (24 persons, 54.55%), incorrect utterance of target syllable with rising tone (12 persons, 22.27%). And the statistics for the acquisition of sentence rising tone are as follows (in top-down order): incorrect reading of longer sentences with rising tone (32 persons, 72.73%), lack of practice of rising tone of sentences in senior high school (32 persons, 72.73%), with no knowledge of the onset syllable or word for rising tone (30 persons, 68.18%), ignorance of the function of intonation (10 persons, 22.73%), incorrect reading of rising tone owing to wrong placement of target syllables or words (12 persons, 22.27%).

The survey by questionnaire also concerns the learners' knowledge of parameters regarding acoustic realization of stress and rising tone. According to the statistics, 31 subjects have the knowledge that stress is realized by intensity contour in the spectrogram, taking up 70.45%, while 30 know that intonation is realized by pitch contour in the spectrogram, accounting for 68.18%.

Based on the above results, it can be found that the acquisition of sentence stress and intonation is much more difficult than that of words. The prominent problem in the acquisition of rising tone of words lies in lack of knowledge of the onset syllable, whereas the main problem regarding the acquisition of sentence rising tone consists in the inappropriate handling of longer sentences. And there are various reasons for the problems, such as rare practice of English rising tone in senior high school, lack of basic knowledge in phonetics and phonology, lower ability in the perception of rising tone.

2.2.2 Results and Discussion of Recordings

Basically, the rising tone expresses uncertainty, non-finality, or request. According to the four-scale tone labeling system of American linguist and phonetician Pike (1967), English intonation falls into the following four scales: extra high, high, middle, and low. In addition, according to O'Connor, J. D and Arnold G. F (1973), the intonation group is divided into prehead, head, nucleus and tail. Based on the above theories, the basic steps for pronouncing rising tone are as follows: the pitch slides up from the nucleus, with the rising tone sustained on the tail, and climbs up to the "high". In the present study, a series of learners' cases will be analyzed, with focus on the pitch movement of nucleus and tail in particular. Based on perception and acoustic analysis of the selected recordings as well as comparison against the recordings by the native speaker, main problems in the learners' acquisition of rising tone can be listed below. (*Note: the grey contour in the figure signifies the pitch parameter and the dark one intensity parameter; the figures on the left show the learners' acquisition and those on the right the native speaker's production; in the figures on the left, 降调 means falling tone and 升调 stands for rising tone.*)

Table 2. Results of Recordings(40 copies)

		correct	incorrect	
w o r d s	monosyllable	long	36	4 (falling tone)
		book	26	14 (falling tone 8; rising tone 6, but epenthesis of /ə/ after /k/)
	disyllable	student	22	18 (falling tone 12; accented syllable exaggerated; rising tone 6, but epenthesis of /ə/ after /t/)
		ahead	25	15 (falling tone 11; accented syllable exaggerated; rising tone 6, but epenthesis of /ə/ after /d/)
	trisyllable	library	25	15 (falling tone 15, accented syllable exaggerated)
		tomorrow	25	15 (falling tone, some accented syllable transferred ahead to the first one, sounding unnatural)
	quadrisyllable	information	24	16 (falling tone, accented syllable exaggerated to achieve rising tone; some accented syllable transferred ahead to the first one)
		development	20	20 (rising tone 3, epenthesis of /ə/ after /t/; falling tone 17, accented syllable exaggerated)
	dialogues	tomorrow	21	19(falling tone)
		library	17	23 (falling tone)
ahead		23	17 (falling tone 15, accented syllable exaggerated; rising tone 2, but epenthesis of /ə/ after /d/)	

1) Failure to control the contour of pitch of nucleus. For some subjects, the pitch contour of nucleus first rises and then declines on the tail, just like the pitch contour of *tomorrow* shown in Figure 1. And for some other subjects, the pitch contour of nucleus first rises, then declines, and finally slightly rises, as what happens to the tone pattern of *library* shown in Figure 3.

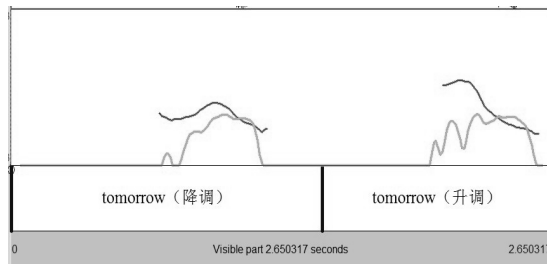


Figure 1.

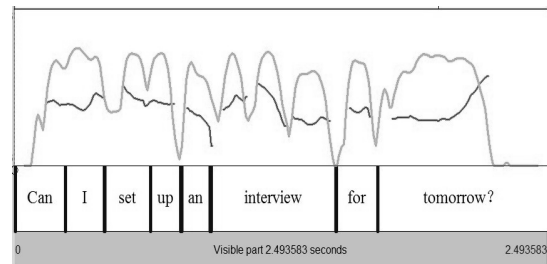


Figure 2.

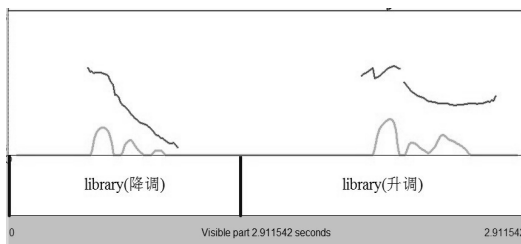


Figure 3.

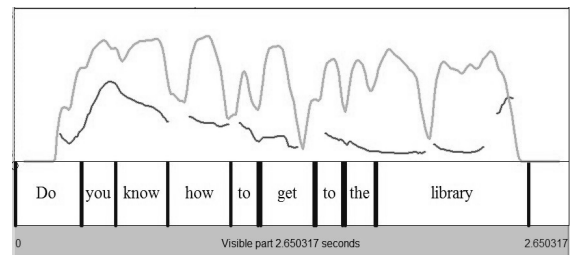


Figure 4.

2) Deviation of rising tone caused by incorrect placement of nucleus stress. When articulating multi-syllable words with rising tone, the learners misplaced the nucleus stress on the unaccented syllable and the tone pattern in general is declining. For example, when read with rising tone, the word *information* shown in Figure 5 has its accented syllables transferred from the third one to the first one. Moreover, it is interestingly found that a few subjects made mistakes in placing nucleus stress when articulating a word with falling tone, whereas they could properly locate nucleus for the same word when reading it with rising tone.

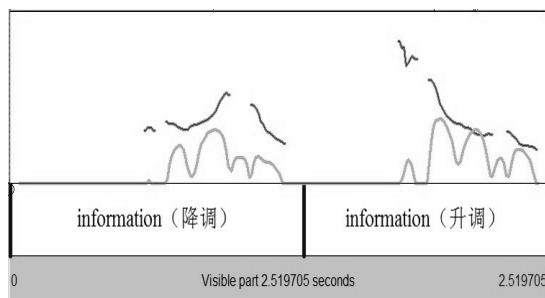


Figure 5.

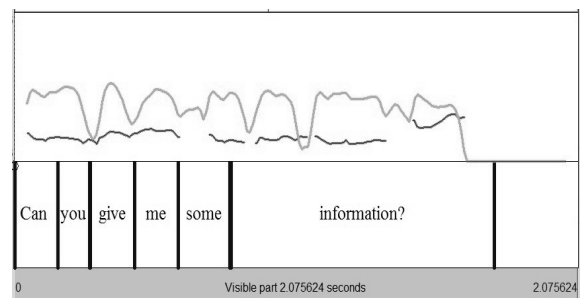


Figure 6.

3) Replacement of rising tone by falling one or flat one. Some subjects may articulate falling tone or flat tone in place of the rising tone owing either to their inability to read with rising tone or to lack of awareness of rising tone.

4) Epenthesis of extra central vowel after the consonant with which the nucleus or tail ends. When reading the nucleus or tail which ends with a consonant with rising tone, some subjects would add /ə/ and articulate it with

falling tone, as what happens to the word *student* shown in Figure 7 and *ahead* shown in Figure 9, which are different from those of Figure 8 and Figure 10.

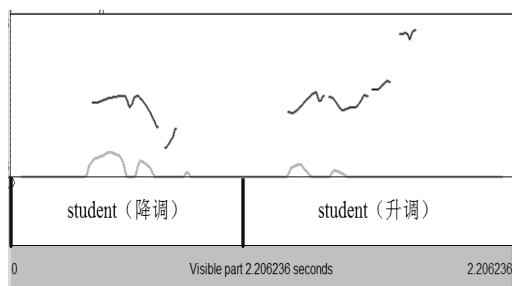


Figure 7.

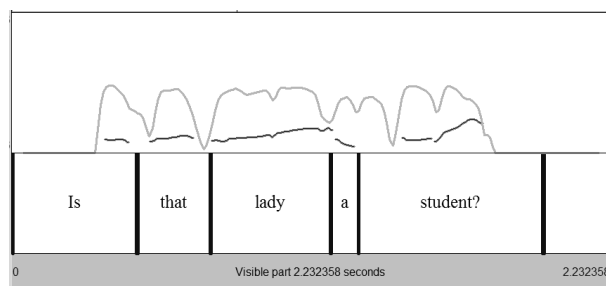


Figure 8.

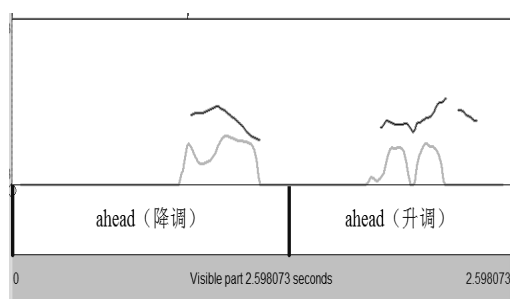


Figure 9.

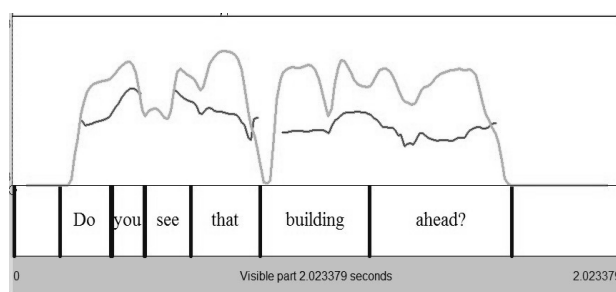


Figure 10.

5) The accuracy of uttering rising tone for an isolated word is higher than that for the same word which serves as nucleus in a sentence or a dialogue, which is obviously shown in *Table 2* in the example of *tomorrow*, *library*, and *ahead*. This suggests that learners lack awareness of rising tone and that the more complex the sentences are, the more difficult it is to manage their rising tone.

6) The acquisition of rising tone is influenced by the number of syllables of a nucleus, which is shown in *Table 2*. In general, the problems discussed above are in line with those shown from statistics of the survey by questionnaire. Through analysis, it can be found that the acquisition of rising tone is mainly influenced by the factors below:

1) Negative transfer from Chinese. Firstly, it is affected by Mandarin Chinese tone patterns. English is a typical intonation language while Chinese is a tone language, and their pitch patterns and rising tone realization modes vary greatly. Through an experimental research, Wang Guizhen (1990) has found that the ascensional range of English rising intonation is larger than that of Chinese; the tone of a Chinese character is slightly adjusted, either by being raised or lowered to achieve the falling or rising, but without being changed beyond recognition. The rising tone of English is realized on the nucleus usually followed by certain number of syllables, while the rising tone of Chinese is reflected in the last character. Secondly, Chinese syllables generally do not end with consonants, while a great many English syllables end with consonants. Affected by this, learners tend to add vowels to the nucleus or tail which ends with consonants.

2) Lack of authentic communicative context as well as insufficient guidance and practice concerning intonation learning. Due to lack of real English communicative context, learners are not sensitive to the pragmatic functions of intonation and are weak in the perception of intonation. And due to insufficient guidance and practice in intonation learning, learners may also fail to understand systematically and thoroughly the concept and pragmatic functions of intonation, and know little about related acoustic knowledge. Therefore, Chen Hua, Sun Xinping, Zhang Ying (2008) have emphasized the significance, need and feasibility of English intonation instruction.

3) Influence by the acquisition of word stress and sentence stress. Incorrect placement of word stress and

sentence stress may lead to incorrect location of nucleus, which directly affects the acquisition of rising tone.

3. Conclusion

The acquisition of English rising tone is of great significance for Chinese learners, but many problems do exist, such as improper placement of nucleus stress, failure to control the contour of pitch of nucleus, replacement of rising tone by falling one, epenthesis of extra central vowel after the consonant with which the nucleus or tail ends. And it is found that the acquisition of rising tone is largely influenced by such factors as lack of intonation knowledge, poor acquisition of stress, differences between English and Chinese tone patterns, etc.

Implications of the present study may be summarized as follows: the study on the acquisition of English intonation still has a long way to go and the intonation instruction is confronted with challenges as well. Besides imparting basic knowledge of intonation and its pragmatic functions, various effective ways may be utilized to improve the learners' acquisition of intonation. One way is to utilize modern computer technology and phonological technology to make possible multimodal phonological acquisition of intonation. For example, the learning of intonation can be visualized through acoustic analysis of Chinese learners' English rising tone by using methods in experimental phonetics; an aesthetic approach can be employed to impart aesthetic knowledge of intonation to learners so as to effectively improve their ability of intonation perception and production.

There are some limitations to this research, though. Recordings of read speech rather than natural and authentic ones are used in the study; the subjects are limited to English majors and the sample size is not big enough, etc. Furthermore, studies on the acquisition of English rising tone by Chinese EFL learners need to be improved in such aspects as research methodology, research content and research scale.

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