A Study on the English Stress Placement of Chinese EFL Learners

Jin Yang

English Department, Nanjing University, China
shigulu@126.com

Abstract

The paper reports an experimental study on the learning of stress placement rules of Chinese EFL learners. The F0 slope of stress assignment rules in English by 30 Chinese EFL learners were compared with that of native speakers. The learners had an average of 5-minute instruction with a ten-minute practice period. The stimulus words, sentences, and paragraph contrast the compound stress rule and nuclear stress rule in compound nouns and noun phrases such as the 'White House' and 'a white house.' The result indicates that the learners had an F0 drop for the compound nouns but an F0 rise for noun phrases. It is also observed that the learners showed a more characteristic F0 slope than the native speaker did. It is thus concluded that Chinese EFL learners easily learn stress assignment in English, which is realized as pitch.

Index terms: stress assignment rules, F0 slope, compound noun, noun phrase

1. Introduction

The learning of English stress patterns has been a thorny issue in second language acquisition. Much literature is devoted to a solution to this problem. Chela Florez (2001) found in her long-time teaching experience that lengthening the stressed syllables and reducing the unstressed syllables are the biggest challenge facing EFL learners and he suggests that rhythmic patterns should be the primary pronunciation units in a pronunciation course because if attention is paid to any other phonological feature, it might induce the learner to make unnatural pauses and break the rhythmic pattern. He suggested that there should be enough training on the stress pattern on word level, then to phrase and sentence level until learners can automatically use the rhythmic patterns. In can be seen from his suggestions that instructions on English suprasegmental features should be centered upon the stress assignment rules.

2. Literature review

There has been quite a number of studies on the learning of English stress patterns by Chinese EFL learners. Many studies attribute the mistakes in English stress patterns to the negative influence of Chinese language. It is reported in various studies that failure in differentiating between stressed and unstressed syllables and ill-positioning of stress are among the many errors in the production of English stress patterns. But many studies are limited in that most of them are merely classroom, teaching experiences, or, to the best, comparative studies between Chinese and English rhythms (e.g. Qin, 2007; Han, 2006). Many studies are without support of empirical data. Among the studies on the learning of word-level stress, only Gao (2006) did an empirical study on the oral readings of EFL learners in China. The mistakes in stress placement accounted for only 79 out of 8624 mistakes from the recordings of 125 students. She analyzed four types of ill-placed stresses, namely [S1], [S2], [S3] and [S4], meaning the stress has been strongly placed on the first, second, third and fourth syllable. The tokens for each of them are 1, 43, 26 and 9. [S2] is the type that has the most mistakes and it is relatively easy for students to avoid [S1]. Mistakes in stress placement often occur in multi-syllabic words. Because word-level stress can lead to differences in word meaning, mistakes in stress placement can cause more communication break-downs than other pronunciation errors.

Gao’s studies show that though smaller in number of stress placement than other pronunciation mistakes, the severity of problems is alarming. It is recommended by Chela Florens that some form of special training should be provided to learners. Kim and Flynn (2004) in Korea found that upon receiving short-term training, Korean EFL learners can grasp stress placement rules. Jeoung (2003) found that Korean EFL learners can have a good command of stress rules at word and phrase levels although they could not at sentence and paragraph level. Kim and Flynn (2004) found that after receiving some training, EFL learners can grasp the rules at all three levels i.e. that of word, phrase and sentence. This study is a replicate one especially to Chinese EFL learners.

3. The present study

The aim of the present study is to investigate whether Chinese EFL learners can command the stress placement rules of compound nouns and noun phrases after receiving training.

According to the compound stress rule by Chomsky and Halle (1968, p.17), stress is assigned to the left side of the constituent. Whereas for noun phrases, the stress is put to the right side of the constituent according to nuclear stress rule.

As commented by Kim (2004), many studies are aimed at elaborating the rules of the two kinds of rules, little studies have been conducted on the learning of these two rules from an acoustic perspective.

We would like to elaborate on this aspect in this study by testing whether receiving a short-term training can Chinese EFL learners produce accurate stress rules.

3.1. The acoustic cues for English stress

Acoustic cues of English stress have been suggested to be F0 (Hz) reflecting the pitch height (Jeoung, 2003), syllable duration that reflect relative loudness (Kim and Flynn, 2004) and intensity, reflecting relative amplitude. These cues are related to the nature of stress, whose relative prominence is represented by pitch height, loudness, vowel length, muscular tension, or respiratory energy (Ladefoged, 2001; p.93). But Fry (1955), Bolinger (1958) and Liebermann (1960) hold that pitch and syllable duration are more important cues in the measurement of stress.

3.2. Research hypotheses

The hypotheses of the present study are as follows:
(1) The stress placement of the native speech should conform to the rules of compound nouns and noun phrases.
(2) After Chinese EFL learners command the stress placement rules, the pitch value of the syllables in their speech should manifest a contrast between the compound stress rules and nuclear stress rules.

(3) Chinese EFL learners can readily command the compound stress rules and nuclear stress rules after a certain amount of training.

3.3. Methods

3.3.1. Participants

Thirty English majors (18 female and 12 female) took part in the study.

3.3.2. Pre-experiment training

In order to check whether learners have any understanding of stress placement rules, 5-minute instruction was given to them before the experiment.

3.3.3. Research materials

The research materials were those used in the studies by Jeong (2003) and Kim & Flynn (2004). They were comprised of 12 contrastive sets of compound nouns and noun phrases, and 7 sentences and 1 paragraph that contained these contrastive compound nouns and noun phrases (see appendix).

3.4. Experiment procedures

Before the experiment all participants received 10-minute training. They were given a piece of paper with 20 items in the stimulus list. The researcher gave instructions on the English stress placement rules to the participants. For example, in the noun phrase “a white house”, the stress should be placed on the word “white”, whereas the stress in the compound noun “Whitehouse” should be placed on the left side of the constituent. Then all the participants listened to and repeat after the native speech in the stimulus list. After that all participants could make use of 10 minutes and practice the stress placement rules again and again. After the practice, the participants were asked to read the stimulus list with 20 items. Their recordings were recorded by Praat with the sampling rate at 16 KHz and 16 bits. Each recording lasted about 2 minutes for each participant.

3.5. Data analyses

In order to measure the F0 value, we measure the mid-point of each vowel of interest by Praat. Should there be any abnormal recordings, e.g. too noisy to be analyzed or too unnatural sounds, we would delete them and replace with the average value of F0. The data is regarded as “raw data.” After obtaining all the raw data, we normalized all the data with the average F0 value of each speaker. To be specific, all F0 values were first divided by the average F0 value of all stressed syllables per speaker, and then timed by the average F0 value for all speakers. The following formula shows the process of the normalization (see Kim (2005)):

\[
N_F0(HZ) = \left( \frac{R_F0_i}{\left( \sum_{i=1}^{n} F0_{\text{left}} \right) \times \left( \sum_{i=1}^{n} F0_{\text{all}} \right) } \right) \quad (\text{where: Normalized F0(Hz) = normalized F0 value, Raw F0 = the raw F0 values, F0\_left = F0 values for each speaker, and F0\_all = F0 values for all speakers})
\]

4. Results and Discussion

4.1. Calculation formula

It is found that a clear contrast between the two stress placement exist in native speakers’ speech. The F0 difference (\(\Delta F0\)) of a given element from that of the preceding element indicates a pitch drop or rise: a negative value for pitch drop and a positive value for pitch rise. In other words, the F0 difference between adjacent elements represents the F0 slope of pitch rise or pitch drop.

\[
\Delta F0 (Hz) = F0 \_\text{right} - F0 \_\text{left}
\]

(Note: \(\Delta F0 (Hz) = F0\) value differences, \(F0\_\text{left} = F0\) values of the first constituent of the structure, and \(F0\_\text{right} = F0\) values of the second constituent of the structure.)

We will use “F0 slope” to refer to \(\Delta F0 (Hz)\) because it indicates the pitch drop or rise. Table 1 shows the normalized F0 values and the standard deviations (in the brackets) of compound nouns and noun phrase in the speech of both learners and the native speakers. The last column shows the difference of the two contrasting slopes.

Note: due to lack of data of native speakers, we adopted the data from Kim (2005).

Table 1. Average F0 values of compound nouns and noun phrases in different reading styles (n=730).

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Reading style</th>
<th>CN ((\Delta F0))</th>
<th>NP ((\Delta F0))</th>
<th>(\Delta F0) (CN-NP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native speaker</td>
<td>Isol</td>
<td>-37.9(24.5)</td>
<td>2.3(17.1)</td>
<td>40.2(23.6)</td>
</tr>
<tr>
<td></td>
<td>Sen.</td>
<td>-21.9(14.3)</td>
<td>-4.3(15.4)</td>
<td>17.6(21.6)</td>
</tr>
<tr>
<td></td>
<td>Para</td>
<td>-26.1(15.5)</td>
<td>-7.1(20.2)</td>
<td>19(20.3)</td>
</tr>
<tr>
<td>Learner</td>
<td>Isol</td>
<td>-38.2(15.8)</td>
<td>28.7(18.8)</td>
<td>66.9(38.9)</td>
</tr>
<tr>
<td></td>
<td>Sen.</td>
<td>-23.5(10.2)</td>
<td>24.4(14.4)</td>
<td>42.1(47.9)</td>
</tr>
<tr>
<td></td>
<td>Para</td>
<td>-22.3(16.9)</td>
<td>8.9(10.9)</td>
<td>31.2(20.1)</td>
</tr>
</tbody>
</table>

(Note: \(CN\Delta F0\)=F0 value in compound nouns; \(NP\Delta F0\)=F0 value in compound nouns; \(\Delta F0\)=F0 difference between compound nouns and noun phrase. Isol. = isolated reading; sen. = sentence reading; para. = paragraph reading.)

4.2. Analyses

Table 1 shows that in learners’ speech, F0 slope of compound nouns (\(CN\Delta F0\)) are similar to those of native speakers. But there are differences in the noun phrases. Learners have placed the stress on the right side of the constituent, thus the value of F0 slope is positive. For native speakers, the \(\Delta F0\) in isolated reading is positive while negative in sentence and paragraph reading. Considering the declination phenomenon in sentence reading, thus the negative values are still acceptable and we think native speakers still place stress on the right side of the constituent. In the three
reading time, it is clear that learners show a better performance in the smaller unit of utterances. In other words, learners can easily command the stress rules in isolated readings. Yet as utterances becomes longer, there are more linguistic variables that have to be managed. As a result, learners’ attention might be distracted.

The above results are consistent with the findings in Jeong (2003) and Kim & Flynn (2004), showing the common feature in EFL learners.

5. Conclusions

We can conclude from the above findings that for adult EFL learners, some suprasegmental features of English can be learned. In the eyes of many SLA researchers that it is impossible to reach a native-like competence for adult L2 learners. However, the present study has shown that EFL learners have a good command in the pronunciation of vowel in the stressed syllables. Partly because both Chinese and Korean are tone languages in which accentual pattern is realized by pitch height (Zhong & Yang, 2004). The difficulties mainly lie in the reduction of unstressed syllables which does not exist in their L1s.

6. Implications

The findings of the present study imply that it is better to have easier aspects in the syllabus and later arrangements for less easy aspects such as the vowel reduction of unstressed vowels. More time and practice are needed for those difficult features.

7. References

Appendix

1. a. the White House (the residence of the President of the United States)
   b. white house (a house that is white in color)
2. a. a lighthouse (a tall tower with a light for warning ships)
   b. a light house (a house that lets in a lot of light, or that is painted with a light color)
3. a. a blackboard (a large slate used for writing with chalk)
   b. a black board (a long piece of wood that is black in color)
4. a. a darkroom (a special room used in photography)
   b. a dark room (a room that is dark)
5. a. a hotplate (an electric cooking device)
   b. a hot plate (any plate that is hot)
6. a. a hard-ball (a baseball)
   b. a hard ball (any ball that is hard)
7. a. The residence of the President of the United States is the White House.
   b. I really want to live in a white house on the hill.
8. a. I can’t see the blackboard.
   b. It is made of a black board. (a long piece of wood that is black in color)
9. Not all dark rooms are darkrooms. (A special room for photography)
10. There’s a hot plate on the hotplate. (An electric cooking device)
11. I want to have a hard ball to play hardball. (a baseball)
12. Since I’ve been living by the sea, I’ve seen a lighthouse from my dark room through the broken window. But, I have long wanted to move to a beautiful city where I can live in a white house on the hill to work with my photography in a dark room. I have to work hard so that I can recover from the catastrophic economic cutbacks that occurred last year. If they offer an excellent base salary, I can get a job even as a porter in the White House to secure my future. If my dreams come true, I might carry all my possessions, including a hotplate for cooking and even a hard ball for hardball (baseball).