Explicit Rules or Implicit Imitation: a Comparative Study of Two Approaches to Teaching English Prosody

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ABSTRACT

This study aims to explore the effect of explicit and implicit instructions on improving English pronunciation as far as stress production is concerned. 28 tertiary-level Chinese EFL learners were divided equally into two groups and attended a pronunciation training course instructed using the two approaches in question respectively. The pre-test and post-test, involving an identical controlled reading task, were conducted before and after the experiment. Participants' recordings were analyzed acoustically on PRAAT. Readings of intensity peaks and pitch averages for each syllable at word-level and for each word at sentence-level were obtained. These values were then processed in order to obtain the difference in amplitude and pitch between stressed and unstressed syllables/words. The statistical results generated from a series of repeated measures ANOVAs revealed that while both groups improved their pronunciation in stress production, the improvement was more pronounced in the explicit group.

Keywords: English stress, implicit approach, explicit approach, prosody teaching

1. INTRODUCTION

Improper English prosody is one primary cause of foreign accent which can lead to unintelligibility of an EFL learner's speech [1]. Early research on pronunciation focused almost exclusively on segmental instruction. However, in more recent studies, a paradigm shift has been witnessed from a focus on segmentals to an increased emphasis on suprasegmental aspects and prosody [2].

Several studies have attempted to prove the effectiveness of introducing rhythm instruction within the English L2 class to improve EFL learners' prosodic skills [3] [4]. Nevertheless, there is still a scarcity of research exploring the efficacy of prosody instruction, especially to Chinese EFL learners whose L1 has a completely different rhythm from English.

Therefore, the current research intends to investigate if Chinese EFL learners' pronunciation could be refined by a period of training as far as word stress and sentence stress are concerned. Explicit vs. implicit instruction methods are investigated in terms of their efficacy in improving EFL learners' pronunciation. Both approaches have been widely researched, and positive effects have been observed. We aim to further explore whether improvements vary between the two approaches after the same period of training. The following two major research questions are formulated:

RQ1. Does prosody training help Chinese EFL learners with their production of English stress?

RQ2. Which approach (explicit vs. implicit) is more effective in improving Chinese EFL learners' production of English stress?

2. LITERATURE REVIEW

The issue of whether to teach pronunciation implicitly or explicitly has long been a matter of controversy. According to Ellis [5], implicit instruction advocates unconscious and automatic learning, which is similar to the process of first language acquisition; explicit instruction, on the other hand, constitutes direct intervention and provides descriptions and explanations of the rules to facilitate learning.

Abundant studies carried out in a variety of EFL/ESL contexts have taken side for the explicit approach and obtained positive results generated from explicit teaching [3] [6] [7] [8]. However, there are other studies that have favored an implicit instruction of pronunciation [9] [10] [11], taking it for granted that such a mode of instruction could help learners enhance their English pronunciation by arousing their unconscious knowledge.

Meanwhile, a more balanced view is put forward by [12] that both instructions, explicit and implicit, have equally significant effects on pronunciation learning. "It might be the input, practice, and feedback included in pronunciation instruction, rather than the explicit phonetics lessons, that are most facilitative of improvement in pronunciation" [12].

Despite the existing controversy in the literature, it is observed that most associated research is confined within the segmental level, very few studies have extended the research scope to suprasegmentals in terms of word stress. Particularly, sentence stress instruction and its efficacy has barely been covered up to date.

3. METHOD

3.1. Participants

28 tertiary-level Chinese EFL learners (20F, 8M) aged from 21 to 25 were selected to participate in the study. Every participant had reached the equivalent level of English B1-B2 (based on CEFR standard) prior to the experiment, according to the English official exams they had taken (IELTS, TOEFL, CET6,TEM 4). Most of the participants were language major students or graduates (English & Spanish) and all of them claimed unfamiliarity to English prosody and lack of rhythm in their speech, according to the questionnaire collected before the experimental treatment. Participants were equally divided into two groups (explicit vs implicit) and attended a pronunciation training course instructed by different approaches.

3.2. Procedures &Materials

For each group, the training course consisted of 8 modules of approximately 30 minutes each, with a frequency of twice per week. The training was completely done remotely via ZOOM due to the Covid restrictions.

The pronunciation course was designed to instruct placement of word stress and sentence stress. Following the same syllabus, however, the teaching approaches and materials varied between the two experimental groups. The explicit group was exposed to the pronunciation rules explicitly. For instance, students were instructed with different types of sentence stress, namely, sentence-end tonic stress, stress shift for new information, contrastive or emphatic purpose. Meanwhile, the implicit group was provided with the same practice materials used in the course accompanied with native speaker recordings to imitate, which the other group did not have access to. Thus, the implicit group was expected to infer the underlying rules themselves without explicit instruction from the researcher.

All participants took a pre-test before the treatment and the identical test upon completion of the training as the post-test. Both tests comprised a controlled reading task of a series of words and sentences/dialogues. The selected words contain at least two syllables so that the stress difference between syllables could be identified. The following 8 target words chosen: *curiosity*, *maintain*, *analysis*, *satisfactory*, *agriculture*, *analyze*, *cooperate* and *immigrant*.

In terms of sentence/dialog reading, different types of sentence stress were covered. For instance, Figure 1 presents the sentences involving contrastive stress in the pre/post-test.

1. He is a doctor and I am a nurse.
2. I love playing badminton rather than watching it.
3. Is he traveling here? No, he is living here.
4. I prefer a car to a bike.
5. He cleaned the room, not me.
6. It is cold in the morning and hot in the afternoon.

Figure 1: Target sentences with contrastive stress in the Pre/Post test

Given the restrictions imposed by the remote research conditions, the recordings were done on the participants' own mobile devices in a required noise-free environment then transferred to the researcher.

3.3. Data analysis

Pre-test and post-test data produced from only 7 participants from the explicit group and 10 from the implicit group were adopted for acoustic and statistical analysis as the rest failed to complete 90% of the 8 sessions. We set a high attendance standard for data collection so that the effect of course implementation could be verified with higher confidence. All the recordings were then transcribed and analyzed acoustically using the PRAAT software. Due to time and space limitation, this paper only presents the result of a selection of the controlled reading data from the pre- and post-test, particularly related to word stress and contrastive stress.

As far as word stress is concerned, each syllable in the word was identified in the acoustic signal and a reading of the intensity peak and pitch average was obtained. These values were then processed in order to obtain differences in amplitude and pitch respectively between the syllable with the primary stress and a randomly selected unstressed syllable from the same word. Eventually, these values of difference were compared statistically between pre- and post-test for each group.

In terms of contrastive stress, the procedure was slightly different. Each word in the sample sentences was segmented rather than the syllables, and so were the intensity peak and pitch average readings. Just as in the word stress analysis, differences in amplitude and pitch were likewise calculated between the target contrastive stress and another random content word within the same sentence.

Regarding the statistical method, a series of repeated measures ANOVA tests were performed to compare the pre- and post- difference as well as across groups.

4. RESULT

4.1 Statistical analysis of words

Table 1 presents the words' intensity difference for each group between the two time points by means and SD. Both groups have witnessed an increase in their values in the post-stage compared with the pre-stage.

Time	Group	Mean	SD	N
Post	Explicit	1.623	3.886	56
	Implicit	0.825	3.190	80
Pre	Explicit	−0.277	2.738	56
	Implicit	0.548	3.752	80

Table 1: Word intensity Mean and SD statistics for two groups in two stages.

The improvement was more pronounced in the explicit group: M =-0.28, SD = 2.74 in the pre-test and M=1.62, SD =3.89 in the post-test. The implicit group, on the other hand, obtained M =0.55, SD = 3.75 in the pre-test, and M = 0.83, SD =3.19 in the post-test conditions. Figure 2 illustrates these differences.

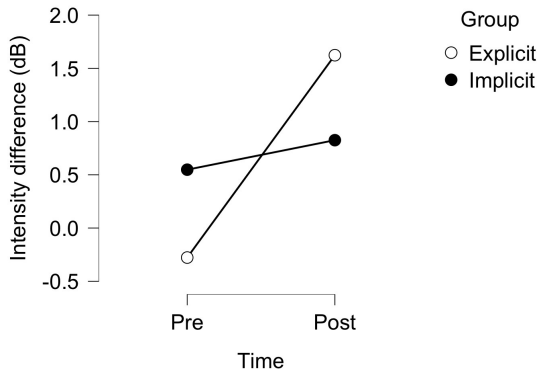

Figure 2: Plot of word intensity difference across groups in two stages.

The results of the post-hoc tests indicate no significant difference in the pre-test stage for the two groups (t=−1.60, p=0.33), which means the participants started at a similar level before entering the experiment. However, the explicit group witnessed a significant difference between the pre and post stage (t=−3.86, p<.05), whereas the implicit did not (t=−0.48, p=0.63).

In terms of the pitch analysis, both groups have shown a higher pitch difference in the post stage. In the same vein, the explicit group revealed a bigger difference between pre- and post- test, as presented in Table 2 and Figure 3 (Explicit: pre M=8.82 vs post M=21.60; Implicit: pre M=14.54 vs post M=23.68).

Time	Group	Mean	SD	N
Post	Explicit	21.599	36.688	56
	Implicit	23.679	39.566	80
Pre	Explicit	8.822	29.966	56
	Implicit	14.543	37.263	80

Table 2: Word pitch Mean and SD statistics across two groups in two stages.

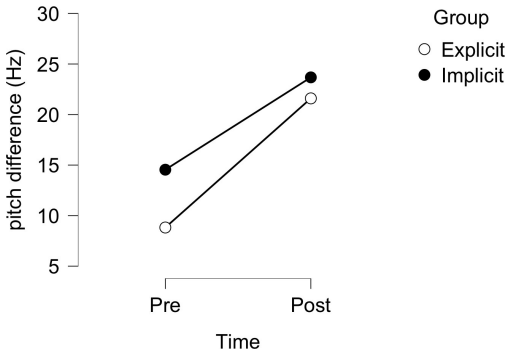

Figure 3: Plot of word pitch difference across two groups in two stages.

Slightly different from the statistics for intensity, the post-hoc tests indicate a significant improvement in pitch difference between pre and post-stage in both groups (Explicit: t=−3.48, p<.05; Implicit: t=−2.63, p<.05).

4.2 Statistical analysis of contrastive sentence stress

Regarding contrastive sentence stress, Figure 4 presents the intensity difference between the pre and post stages in the two groups. As seen in graph, both groups have experienced an increase in intensity difference in the post stage. A greater contrast was seen in the explicit group (pre M=-0.28, SD = 2.74 vs post M=1.65, SD = 4.02) than the implicit group (pre M=-0.13, SD = 4.56 vs post M=1.01, SD = 4.48), seen from the descriptive statistics in Table 3. However, the improvement was significant in both groups between pre and post, as indicated by the results of the post-hoc tests (Explicit: t=−4.20, p<.05; Implicit: t=−3.17, p<.05).

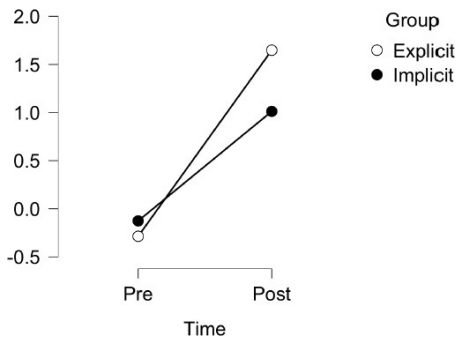

Figure 4: Plot of intensity difference for contrastive sentence stress across groups in two stages.

Time	Group	Mean	SD	N
Post	Explicit	1.647	4.016	84
	Implicit	1.011	4.481	120
Pre	Explicit	−0.286	3.063	84
	Implicit	−0.126	4.560	120

Table 3: Intensity Mean and SD statistics for contrastive stress across two groups in two stages.

Taking a look at the pitch statistics for contrastive sentence stress, Figure 5 shows a very similar pattern to the intensity graph shown above. Once again, the explicit group revealed a bigger difference than the implicit group (Explicit: pre M= -3.27, SD = 41.36 vs post M=13.61, SD = 64.00; Implicit: pre M= -1.84, SD = 44.90 vs post M=9.44, SD = 47.15), seen from Table 4 descriptive figures.

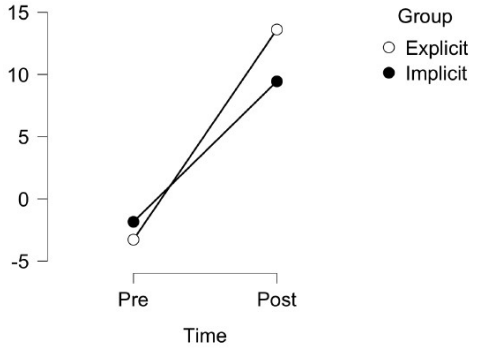

Figure 5: Plot of pitch difference for sentence contrastive stress across groups in two stages

Time	Group	Mean	SD	N
Post	Explicit	13.611	64.004	84
	Implicit	9.444	47.146	120
Pre	Explicit	−3.272	41.357	84
	Implicit	−1.838	44.896	120

Table 4: Pitch Mean and SD statistics for contrastive stress across two groups in two stages

Yet, the significant difference was only obtained in the explicit group between the pre and post ($t=-3.18$, $p<.05$), whereas the implicit group did not show a significant improvement ($t=-2.22$, $p= 0.13$).

5. DISCUSSION & CONCLUSION

In answer to RQ1, the above results for both intensity and pitch measurements have revealed positive increases from the pre stage to the post, which indicates that participants were showing awareness to place more stress on the target words. It seems our prosody training has worked efficiently on participants from both groups, despite the fact the progress in some cases was not statistically significant.

Particularly, the explicit group demonstrated significant improvement in the post stage for word stress and contrastive sentence stress respectively, supported by the statistics of both pitch cues and intensity cues. Nevertheless, the differences in the implicit group were not consistently significant. For instance, regarding word stress, only the pitch cue showed a significant difference and progress represented by the intensity cue was insignificant. Yet, sentence stress exhibited the opposite trend. Significance was detected in intensity values rather than pitch.

Despite the customary belief that stressed syllables are usually produced with relatively higher F0, greater intensity, and longer duration compared to unstressed syllables [13], inconsistency among these measurements is not rare to trace in acoustic research, especially when external factors are involved, e.g. noise, pitch accent, which can cause misrepresentation on intensity and F0 cues. Besides, there has been a lack of consensus on the hierarchy of the acoustic correlates of English lexical stress. Most believe the primary cue for stress in English in both natural and synthesized speech is relative pitch prominence, followed by length and amplitude [14] [15] [16]. Thus, although pitch and intensity values did not always correspond with each other in terms of significance, the tendency of showing improvement was demonstrated.

Above all, to answer RQ2, it seems the treatment in the explicit group has generated better results to improve participants' production of word stress and sentence stress. Such a finding concurs with the existing literature advocating explicit pronunciation instructions. With the help of explicit rules, learners are more likely to notice language features and build up a greater awareness to pronounce the stress strongly. On the other hand, the implicit approach, despite its visible potency, did not benefit learners to the same extent. This could be explained by the connectionist theories that implicit knowledge requires exposure to massive amounts of input and acquisition is a slow, organic, elaborate process [17].

Our study only provided a short-term training and thenative recordings for imitation practice could not meet the criterion of massive amounts of input. Therefore, it appears logical to assume that the implicit group could not achieve as notable a progression as the explicit group. However, as Ellis [18] suggested, the explicit knowledge resulted from explicit learning can assist the processes involved for implicit learning, and thus we anticipate that a mix of the two methods might yield a double effect in a positive way. Future studies that incorporate a larger sample for a longer period of prosody training could add more credence to the efficacy of the two approaches in this study.

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