



Investigating the influence of sentence stress perception on foreign accent in utterances

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Abstract

What constitutes a foreign accent is an intricate matter that involves a wide variety of variables. From the phonological perspective, both segmental and prosodic aspects have been revealed to have an influence on the perception of foreign accent [1]. The current research intends to explore whether ability in prosody perception is correlated with the degree of perceived foreign accent in pronounced utterances. 30 Chinese university students aged 21 to 25 with an intermediate level of English provided oral recordings in the form of text-reading and free-talk, followed by an English sentence stress perception test. Subsequently, 6 native English speakers scored the participants' recordings in terms of their foreign accent. The performance on sentence stress perception and the scale of foreign accent were compared to explore whether a correlation exists between the two parameters. The results of the statistical analysis indicated a significant positive correlation. Thus, this study provides new evidence of the need to investigate the acquisition of suprasegmental features in learning English as a foreign language. Based on these findings, effective classroom techniques integrating suprasegmental perception and production could be developed for facilitating EFL learners' acquisition of proficient pronunciation.

Keywords: sentence stress; correlation; perception ability; foreign accent.

1. Introduction

Foreign accent is an intricate matter influenced by a wide variety of variables. Piske et al [2] summarized some of these factors, including age of L2 learning, length of residence in an L2-speaking country, gender, formal instruction, motivation, language learning aptitude and amount of native language. Phonologically, a bulk of research has also examined the influence of segmental and suprasegmental features on the degree of perceived foreign accent [3, 4, 5, 6]. However, interest has mainly focused on segmental deviations from native pronunciation, due

to the complexity of prosody and its pedagogical challenges [7]. Despite the scarcity in the investigation of perceived accent transferred from suprasegmental factors, it has been argued in some research that prosody also significantly contributes to an overall impression of foreign accent [5].

Sentence stress, as one major part of suprasegmental features, plays an important role in the judgment of comprehensibility of speech. Improper sentence stress production is also one primary cause for perceived foreign accent. Studies have corroborated that reduction in sentence stress errors can facilitate non-native learners' production of English rhythm in a more comprehensible and native-like way [5, 8, 9]. Nevertheless, many Chinese learners of English suffer from the complexity of English prosody, due to their lack of awareness of the striking differences between their L1 and the target L2. As a consequence, they are inclined to apply the rhythm of Chinese to English utterances, which results in an unnatural English speech. On that account, the mastery of stress production is regarded as a strong indicator of English proficiency for L2 learners [10].

In terms of perception of stress, previous research has revealed that this aspect has constituted a stereotypical struggle for learners coming from a fixed-stress language background, or a tone-language background [11]. Specifically, learners may apply stress placement in L2 learning based on their native strategy, or, even worse, position it neither following the native nor the second language rules. Chinese learners of English, for instance, with a tonal L1 background, tend to interpret English stress as tones or possibly associate high and low tones with lexical stress [12].

A correlation between the perception and the production of segmental contrasts has been detected in many studies [13, 14, 15], but few have focused on such a relation at the suprasegmental level. The close link between sentence stress production and foreign accent leads us to consider whether the ability of sentence stress perception affects the pronounced foreign accent in utterances. Therefore, the objective

of the current research is to explore whether there exists a correlation between Chinese learners' perception of sentence stress and the degree of foreign accent perceived in their oral production.

2. Research questions and hypotheses

The main objective of the current research is to explore whether better perception of sentence stress can lower the degree of perceived foreign accent produced by Chinese learners of English. In addition, the study also aims to investigate whether speakers' degree of foreign accent varies between controlled reading and spontaneous talk. The research questions and corresponding hypotheses are as follows:

RQ1. Does the performance in perceiving English sentence stress influence foreign accent in utterances?

RQ2. Does accent in oral production vary in different type of tasks, i.e., controlled reading vs. spontaneous talk?

On the grounds of the disparate rhythmic patterns in English and Chinese, Chinese EFL learners are commonly challenged with determining the appropriate location of stress within a sentence, either in perception or production. Thereby, our hypotheses are:

Hypothesis 1: There is a proportional correlation between perception of English sentence stress and perceived foreign accent. Specifically, better stress perception guarantees a more native-like rhythm.

Hypothesis 2: The type of production tasks does not influence the perceived degree of foreign accent significantly.

3. Methodology

3.1. Participants

30 Chinese university students (19F, 11M) aged from 21 to 25 were recruited to participate in the research. All participants 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). None of the students had lived abroad or had received systematic training regarding sentence stress.

3.2. Materials

The study consisted of one oral production test (Test 1) and one stress-perception test (Test 2) to assess participants' production and perception of sentence stress, respectively. Test 1 was comprised of a text-reading task followed by an uncontrolled free-talk picture description. For Test 2, participants listened to an audio of a series of conversations, from where they were asked choose the most stressed word in each sentence.

3.3. Procedure

The Production Test was conducted upon the completion of the Perception Test, ensuring that participants were unaware of the focus of the test, hence providing natural productions. Once production data were collected, 6 native English speakers acted as evaluators to judge participants' recordings in terms of their foreign accent on a scale from 1 to 7 (the higher the score, the heavier the foreign accent).

Subsequently, when conducting the stress-perception test, participants listened to an audio of a series of conversations and chose the most prominent (stressed) word from each sentence. 40 words in the listening transcript were stressed in total. The participants could play the audio only once. Afterwards, the number of errors from each participant was compared with his or her average accentedness score evaluated in Test 1 by the 6 judges.

Based on the research aims of this paper, the data were analysed by applying the following two methods: i) scatter plots and Pearson's product moment correlation tests for investigating the relationship between the abilities of stress perception and the degree of foreign accent perceived in oral production; ii) a paired-samples t-test for comparing variations in participants' accent level in the performance of controlled reading and spontaneous talk. Results are presented in Section 4.

4. Results

In order to address the first research question, a correlation test between ability of sentence stress perception and the degree of perceived foreign accent was performed. The following two scatter-plots present the relation between participants' number of errors in the perception test and the perceived foreign accent in the two production tasks from the speaking test respectively.

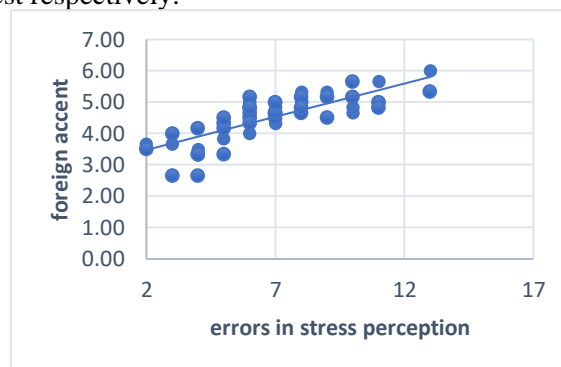


Figure 1: Correlation between stress perception and foreign accent rate in Task 1

The upward trend in Figure 1 indicates that the more mistakes participants make in stress perception, the higher they are rated in terms of foreign accent. The Pearson's correlation test proves there is a significant positive correlation between sentence stress perception ability and perceived foreign accent exposed in the controlled reading production ($r = 0.84, p < 0.01$).

Moving to the production data collected from the spontaneous talk, a positive association is again detected between the stress perception errors and participants' foreign accent rates in Task 2, as shown by the scatter-plot in Figure 2. The correlation is proven to be significant by the correlation value ($r = 0.75; p < 0.01$).



Figure 2: Correlation between stress perception and foreign accent rate in Task 2

Concerning the second research question, i.e., whether the type of oral tasks (controlled reading vs. spontaneous talk) influences native listeners' judgement towards Chinese learners' accent of English, a paired-samples t-test was performed to compare the difference in accent rate between the two tasks in Test 1. Figure 3 below displays the average rates in Task 1 and Task 2 respectively. From the graph, we can barely observe any difference between the two tasks.

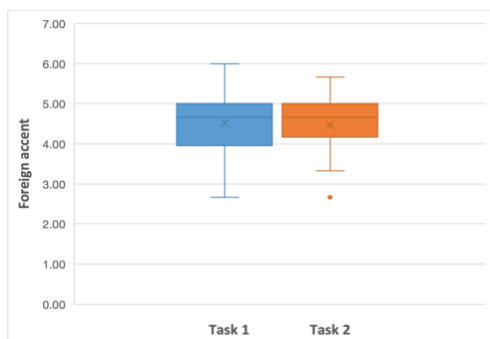


Figure 3: Foreign accent rates mean in text-reading (Task 1) and free-talk (Task 2)

5. Discussion

Regarding Research Question 1, the data distribution in Figures 1 and 2 proves that there is a proportional

correlation between the perception of sentence stress and the perceived foreign accent in oral production, specifically, non-native speakers with weaker perception in sentence stress show a higher degree of foreign accent. Moreover, the correlation is highly significant, judged from high r coefficient values (0.84 and 0.75). Thus, the results obtained in this study provide support for Hypothesis 1, i.e., weaker stress perception ability leads to a heavier foreign accent, or alternatively, better stress perception is likely to guarantee a more native-like rhythm. These results are in accordance with earlier findings which have substantiated the feasibility of using perceptual abilities to predict accuracy in production. Practically, cognitive scientists across disciplines have revealed strong interests in the connection between speech perception and production. Sakai and Moorman's meta-analysis [15] provides a comprehensive review of the last 25 years of L2 perception training studies that test for effects in production and the results indicate that "the two modalities are connected, insomuch as training the perception of L2 sounds can induce positive change in the productive mode as well. The data indicate that strictly controlled perception training led to medium-sized improvements in perception" (p.187).

In terms of Research Question 2, the oral production test was divided into two parts, controlled text-reading and spontaneous talk, in order to investigate whether production format influences participants' accent. Having run the t-test with the data obtained from the two tasks in Test 1, two nearly equal mean values, 4.52 vs. 4.47, were obtained respectively and no significant difference was detected. This provides some support for the second hypothesis, i.e., the format of production, whether controlled or spontaneous, does not influence non-natives' accent as perceived by English native speakers. The result, from another perspective, justifies the similar correlation trends between perception errors and production accent score displayed in the two scatter plots in Section 4. Specifically, since the participants' foreign accent barely changed in the two production tasks and the perception errors remain the same, the correlation trends naturally ascend synchronously.

Examining the previous literature, there has been insufficient investigation regarding the influence of different forms of oral production on foreign accent. However, studies discussing factors that influence L2 foreign accent are not scarce, although most have focused on segmental aspects. Within the limited sourced literature on suprasegmentals, it has been demonstrated that other prosodic aspects such as speech rate, stress patterns, rhythm, phrasing, intonation and duration, all may lead to perception of

foreign accent [1, 16, 17]. In particular, our study sheds some light on an additional factor, namely, the perception ability of sentence stress, for causing foreign accent in utterances.

6. Conclusions

The results of this study have provided some evidence for the association between Chinese EFL learners' ability in perceiving sentence stress and the degree of foreign accent detected from their speaking. Nevertheless, the perceived foreign accent does not vary as per the variety of production formats. This study brings some new insights into the need to investigate the acquisition of suprasegmental features in English as a foreign language learning. Based on these findings, effective classroom techniques integrating suprasegmental perception and production could be developed for facilitating EFL learners' acquisition of proficient pronunciation.

7. Acknowledgements

This research was supported in part by grant FFI2017-84479-P from the Spanish Ministry of Economy, Industry and Competitiveness.

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