The correlation between perception and production of English sentence stress by Chinese EFL learners

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I. INTRODUCTION

A wealth of research has examined the correlation between perception and production of L2 segmental contrasts. A moderate correlation in vowel perception and production has been detected in numerous studies [1], [2],[3], while there are other researchers that have failed to find definitive evidence of this relationship and argued that good perception does not necessarily guarantee good production [4], [5], [6]. However, few have investigated the relationship between the two variables at the suprasegmental level, especially regarding sentence stress for Chinese EFL learners. Therefore, the current research intends to explore whether a correlation exists between Chinese EFL learners' perception and production of English sentence stress. Two research questions were formed in the study.

RQ1. Is there a correlation between perception and production of English sentence stress by Chinese EFL learners?

RQ2: Does the type of production tasks influence native listeners' judgement towards Chinese EFL learners' accent in oral production?

II. METHOD

30 Chinese university students (19F, 11M) aged from 21 to 25 were selected to participate in the research. Every participant had reached the equivalent level of English 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 nor had received systematic training regarding sentence stress.

The study consisted of an oral production test (Test 1) followed by a stress-perception test (Test 2) to assess participants' production and perception of sentence stress respectively. Test 1 was comprised of a controlled reading task and an uncontrolled free-talk with picture prompts. Informants needed to record their reading and speaking. For Test 2, students listened to an audio of a series of conversations only once, from where they had to choose the most stressed word in each sentence. In total, there were 40 words stressed in the listening. Upon receiving the production data from the participants, 6 native English speakers judged the recordings in terms of foreign accent on a scale from 1 to 7 (higher the score, heavier the foreign accent). The evaluators included three Canadians, two British and one American adults. Four of them were females and two males. Also, three of them were ESL teachers who had teaching experience with Chinese students. Audios were ordered in a random sequence ensuring that the process would be more arbitrary. Finally, each participant's average accent score from the six evaluators was calculated and compared with the number of errors he or she made in Test 2.

Based on the research aims of this paper, the data were analysed by applying the following 2 methods: i) scatter plots and Pearson's product moment correlation tests, for investigating the relationship between the abilities of stress perception and accent of oral production; ii) a paired t-test, for comparing variations in participants' accent level in the performance of text-reading and free-talk.

III. RESULTS & DISCUSSION

The first scatter plot and Pearson's correlation analysis presented in *Figure 1* demonstrates that there is a proportional correlation between perception of sentence stress and accent in overall oral production, specifically, non-native speakers with weaker perception in sentence stress show a higher degree of foreign accent. And the correlation is highly significant ($r = 0.84$, $p < 0.01$). Separating the production data by task type, a positive association is again detected between the stress perception errors and participants' foreign accent rates in Task 1 text-reading and Task 2 free-talk respectively, as shown by the scatter-plots in *Figure 2* and *3*. The correlation is proven to be significant by the correlation value in both Task 1 ($r = 0.84$; $p < 0.01$) and Task 2 ($r = 0.75$; $p < 0.01$). These results are in accordance with earlier findings which have substantiated the feasibility of using perceptual abilities to predict accuracy in production. This alternatively means that better stress perception guarantees a more native-like rhythm, i.e. more accurate stress production. Practically, cognitive scientists across disciplines have revealed strong interests in the connection of speech perception and production. Sakai and Moorman's meta-analysis [2] provides a comprehensive review of the last 25 years of L2 perception training studies that test for effects in production and the results signify 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).

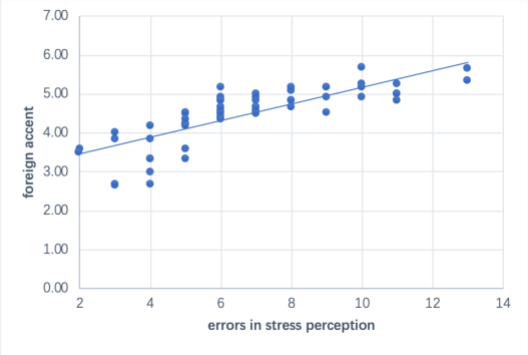

Figure 1. Correlation between stress perception and overall foreign accent rate

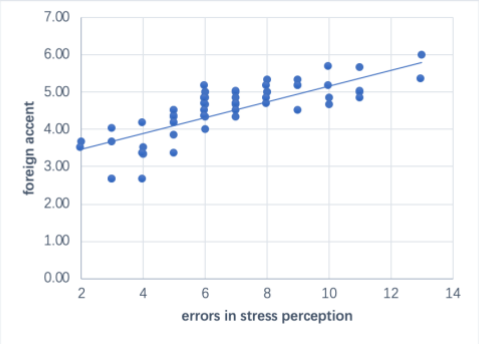

Figure 2. Correlation between stress perception and foreign accent rate in Task 1

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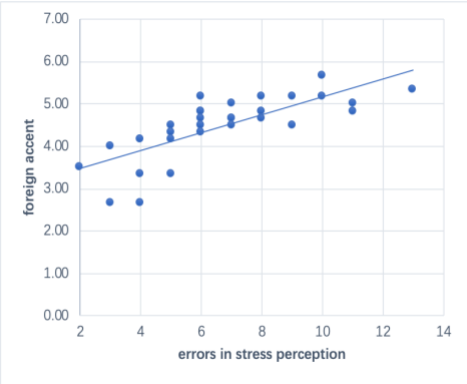

Figure 3. Correlation between stress perception and foreign accent rate in Task 2

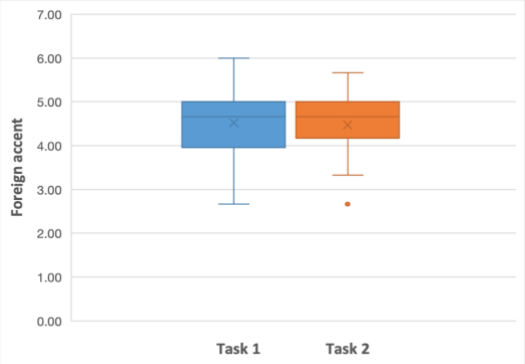

Figure 4. Foreign accent rates mean in text-reading (Task 1) and free-talk (Task 2)

Concerning the second research question, i.e. whether the type of oral tasks (text-reading or free-talk) influences native listeners' judgement towards Chinese learners' accent of English, a paired t-test was performed to compare the difference in accent rate between the two tasks in Test 1. *Figure 4* above displays the average rates in Task 1 and Task 2 respectively. From the graph, we can barely observe any difference between the two tasks. The mean of Task 1 text-reading is 4.52 and Task 2 is 4.47 (see Table 2). The results of the paired t-test shown in Table 4 yield a non-significant difference between Task 1 and 2 ($t = 0.59$, $p > 0.05$). 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. Of the limited sourced literature on suprasegmentals, it has been demonstrated that other prosodic aspects, e.g. speech rate, stress patterns, rhythm, phrasing, intonation and duration, all may lead to perception of foreign accent [7], [8].

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