The Negative Transfer of Chinese Phonology on Students' English Accents and Its Impact on Accent Perception

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Abstract: This paper focuses on the impacts of Chinese phonology on students who learn English as a second language from the production and perception sides. For the production side, this paper focuses on the impacts of Chinese phonology on students' English accents, taking the phoneme /ɪ/ as an example, based on the framework of negative transfer proposed by Edward Thorndike. For the perception side, this work explores whether there is a correlation between the students' pronunciation accuracy and accent perception. In this work, ten Chinese international students were invited as subjects for the experiment, and the matched-guise test was chosen as the methodology. The results in this work show that negative transfer did occur when Chinese students pronounce the phoneme /ɪ/, and it seems that pronunciation accuracy doesn't correlate to their perception of accents. The findings have implications for English education and provide suggestions for Chinese students to improve their pronunciation accuracy as well as their perception of accents.

Keywords: negative transfer, pronunciation accuracy, accent, matched guise, language perception

1.   Introduction

From the perspective of Ahmar Mahboob, the definition of accents was the phonological characteristics of speech; as a result, everyone has an accent [1]. Some studies have found that Chinese international students who use English as a second language have accents. For example, researchers found that Chinese learners sometimes add a vowel between the consonants when they pronounce consonant clusters; Chinese students tend to add a vowel at the end, and they tend to add vowels between the nasal plosive [2]. However, there are few studies about how Chinese international students pronounce the phoneme /ɪ/. As a result, this paper wants to figure out if Chinese phonology has an impact on Chinese students' production of this phoneme based on the theory of negative transfer.

There are many studies on the correlation between language production and perception domestically and internationally. However, there hasn't been a researcher who pointed out whether there is a correlation between pronunciation accuracy and perception of accents. This paper wants to find out whether these two variables have interactions with each other by adopting the methods of matched guise tests.

2.   Literature Review

2.1.   Negative Transfer

Ahmar Mahboob pointed out that some accents stem from the transfer of phonetic features from the first language to the second language, which leads to the theory of negative transfer [1]. Edward Thorndike first proposed the theory of negative transfer, which can be the theoretical framework for this paper [3]. Language transfer can be defined as the impact of differences and similarities between the target language and any other language the learner previously acquired [4], while negative transfer means the target language tends to be interfered with by the native language, and this phenomenon takes place when the two languages are different from each other Wen hui [5]. Since it is acknowledged that English belongs to Indo-European language family while Chinese belongs to the Sino-Tibetan language family [2], negative transfer does occur when learning these two languages, which means Chinese learners seem to unconsciously turn to their mother tongue when speaking English. Some researchers have already found some phenomenon that relates to the negative transfer. For instance, Chinese learners tend to pronounce /θ/ as /s/ and /ð/ as /z/, because /θ/ and /ð/ don't appear in Chinese [2]. As this paper focuses on the pronunciation of the letter /i/, what this paper needs to find out is whether negative transfer appears when Chinese international students pronounce phoneme /ɪ/.

2.2.   Matched Guise Test

Derwing demonstrates that some accents, language dialects, and variations may be stigmatized, so non-native English speakers may face prejudice and discrimination on many levels, especially in terms of pronunciation, which means accents and dialects can stereotype users. Researchers proved this by adopting matched guise tests [6]. The most well-known and sophisticated indirect experimental method of attitude elicitation is the matched-guise technique, developed by Wallace Lambert and his associates [7]. Zhu figured out the steps to plan a matched guise test, that is, to choose the text, record the experimental stimuli, and design the evaluation booklet. These steps guide us on how to create the methodology of this paper [8]. Many researchers have already applied this method in their experiments. In the research of Srongman and Woosley, two groups of subjects were required to hear voices recorded by four speakers reading the same passage [9]. One group of issues comes from the northern part of England, and the other from the southern region. After hearing the voices, both groups needed to rate the speakers on various personality traits. There were only two speakers, each recording this passage twice, once with a London accent and once using a Yorkshire accent. The results were that Yorkshire and London accents were rated differently. Their experimental methods can provide a reference for this study. However, previous experiments have all explored the impact of accents on personality. This paper examines whether appearance affects accent perception, but this experimental method can be used.

2.3.   Language Production and Perception

This paper also wants to determine the correlation between language production and perception. Previous studies have reached different conclusions regarding this issue. According to Almusharraf, how accurately learners produce and perceive phonetic segments in a second language don't correlate to each other, while regarding the experiment of Flege, second language segmental production and perception are correlated [10]. What's more, pronunciation importance seems to connect with the concerns for pronunciation accuracy [11]; interest in second language sounds can be seen as a dimension of an optimistic attitude towards the target language, with confidence in pronunciation accuracy consistent with self-perceived confidence when speaking the second language [12]. What

this study needs to do is to figure out whether pronunciation accuracy will have an impact on Chinese international students' perception of others' accents and to explore which theory is more suitable for the previous experiments based on the results found by this paper.

3. Methodology

3.1. Participants

The study adopted a qualitative 'multiple case study' design. 10 Chinese international students were invited as the subjects of this study, including 3 men and 7 women. They were numbered from 1 to 10. Their average age is 16.7 years old, and they have lived abroad for 6.1 years. The detailed information is listed in Table 1.

Table 1: Information of the participants(N=10).

Number	Gender	Age	Number of years in an English-speaking country
1	M	16	8
2	F	16	6
3	F	17	7
4	F	16	7
5	M	16	5
6	F	18	6
7	F	19	4
8	F	16	7
9	F	17	5
10	M	16	6

3.2. Methods

For the language production side, this paper first found ten targeting words in particular、medicine、hit、sit、fish、pig、villager、mixture、fix, and satisfy. Then, this study made ChatGPT create a 100-word article that contains these ten words, and each word only exists once. The article is shown in the appendix. Secondly, ten subjects were asked to read the same article and record their voices. When processing the records, the readings were numbered as ①-⑩ according to the subjects' number. Then, this study compared subjects' pronunciation of the "i" in words with the non-accented ones and rated each subject's pronunciation from 1-10 to standardize their pronunciation accuracy. The final step is to ask subjects to rate his/her pronunciation accuracy on his/her own from 1-10 to measure their self-perception of accent.

For the language perception side, each subject was required to listen to 10 recordings, which includes the remaining 9 recordings except themselves, and randomly repeat one of these nine recordings (shown in the appendix), which means the first and the last videos are the same. As they listened, they were informed that the first five speakers were non-native and the last five were native by making them see the pictures above the video button, which are created by AI. Secondly, each subject needed to score each recording from 1 to 10, and what this study needs to do is mainly compare the score of the repeated recording.

4. Findings

4.1. Production

This study calculated the pronunciation accuracy of the letter"i" which is shown in Table 2.

Table 2: Pronunciation accuracy.

word	Correct Percentage
particular	40%
medicine	100%
mixture	40%
satisfy	50%
villager	70%
sit	70%
fish	50%
fix	60%
pig	60%
hit	90%

This study also gave each Chinese international student a total score to measure their overall accuracy according to the number of words they read correctly, as shown in Table 3.

Table 3: Total score.

Number	Total Score
1	8
2	6
3	6
4	6
5	4
6	7
7	9
8	6
9	4
10	7

If a Chinese international student gets a "1" when pronouncing a word, it means it is pronounced correctly, while "0" is mispronounced. Then, this study calculated the number of "1" to calculate the correct percentage. From the table of pronunciation accuracy, this study found that Chinese international students tend to pronounce the phoneme /ɪ/ incorrectly, and according to the videos that have been made, Chinese international students tend to pronounce /ɪ/ as /i:/ instead of other phonemes.

4.2. Perception

This study picked out the scores of video 1 and video 10. This study calculated the difference in the scores by subtracting the score of video 1 from the score of video 10. The results are shown in Table 4.

Table 4: Scores and differences for the same video.

Number	Video 1	Video 10	Difference
1	6	7	1
2	8	10	2
3	5	6	1
4	6	9	3
5	7	8	1
6	8.5	9	0.5
7	8	8	0
8	7	8	1
9	8	9	1
10	5	7	2

From the table, it is obvious that 9 out of 10 scores for video 10 are higher than that for video 1, although the two videos are the same. Then, the Chi-square test was used to figure out whether there is a correlation between pronunciation accuracy and their perception of others' accents. This study used the total score to measure their pronunciation accuracy and the difference between the scores of the two videos to measure their perception of others' accents. The results are shown in Table 5.

Table 5: Correlation between pronunciation accuracy and perception.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	19.250[a]	16	.256
Likelihood Ratio	16.094	16	.446
Linear-by-Linear Association	.649	1	.420
N of Valid Cases	10		

Since Sig.=0.256>0.05, there is no apparent correlation between pronunciation accuracy and perception of others' accents. The finding can be explained as Chinese international students with different pronunciation accuracy tend to subconsciously believe that English native speakers' pronunciation is more accurate, and they are all influenced by the guise in their perception of accents. To move one step further, this study also got the scores that subjects rated themselves; the results are shown in Table 6. This data can show the self-perception and self-confidence of subjects' pronunciation.

Table 6: Self-score.

Number	Self Score
1	7
2	5
3	6
4	1
5	7
6	8
7	10
8	7
9	6
10	5

According to the findings, there is a more negligible difference in the scores of two videos from subjects with a higher self-score of pronunciation accuracy. So, a Chi-square test was made between these two variables to see the correlation. The results are shown in Table 7.

Table 7: Correlation between self-score and perception.

Correlations		Self	Difference
Self	Pearson Correlation	1	-.965**
	Sig. (2-tailed)		.000
	N	10	10
Difference	Pearson Correlation	-.965**	1
	Sig. (2-tailed)	.000	
	N	10	10
**. Correlation is significant at the 0.01 level (2-tailed).			

Since Sig<0.01, there is a strong correlation between these two variables. This study used self-score to present their self-perception of pronunciation accuracy while difference to show their perception of others' accents, there is an apparent correlation between them. What's more, according to the Pearson Correlation, which is -0.965, the results can be concluded that there is an apparent negative correlation between their self-score and the difference between their score for the two videos, which means that subjects who have higher scores in the self-perception of pronunciation accuracy are less influenced by the guise and have a better perception of others' accents. Since the self-score can also present subjects' self-confidence in their pronunciation, it can also be said that issues with higher self-confidence in pronunciation accuracy have a better perception of others' accents.

5. Discussion

5.1. Pronunciation of /ɪ/

Since the results of this paper show that Chinese international students tend to pronounce /ɪ/ as /i:/, other researchers have also drawn the same conclusion. From Hu, he pointed out that there are some English single vowels similar to Chinese ones, but the length is different, Chinese /i:/ is more extended than English (/ɪ/), and thus, some Chinese learners would pronounce /ɪ/ longer than it is [13]. This phenomenon can be explained by the theory of negative transfer that similarities between the

phonemes of the two languages cause generalizations in listening and pronouncing English, which, in turn, makes Chinese learners mistakenly treat the similarities between the phonemes as sameness [14].

5.2. Appearance and Accent

For the findings that Chinese international students rate pronunciation accuracy higher because they are shown the faces of native speakers, other experiments also found that appearances and accents interact with each other. In the investigation of Fernández-Mallat, they found that overall, the sound of a British accent is considered blue-eyed and blonde, while the sound of a Mexican accent is considered brown-eyed and brown-haired [15]. Additionally, Holmes K and Murachver T also showed that high school students evaluate speakers' accents based on their appearances [16]. To explain this phenomenon, this study may apply the theory of Hansen K that when people first meet, they immediately classify each other based on characteristics such as gender, age, or race. At the same time, they began to infer the personality traits, accents, and social, political, or religious attitudes of the person they encountered based on their appearance [17].

5.3. Pronunciation Accuracy and Perception

Since this study found no apparent correlation between pronunciation accuracy and their perception of others' accents, the results can also echo other researchers' findings. Almusharraf also claimed that there isn't a correlation between the learners' production accuracy and perception of phonetic segments in a second language [18]. This phenomenon may be explained by the theory of first language "loyalty," which means confident second language learners may not bring production into conformity with perception for psychological reasons JE Flege [19]. For instance, they may not be willing to sound completely the same as a native speaker in the second language for practical reasons.

5.4. Self-confidence and Perception

The last finding concerns the relationship between self-confidence and the perception of others' language. Other experiments also got similar results. Almusharraf found that if learners have higher confidence than the neutral level in their pronunciation accuracy and hold a highly optimistic attitude towards English native-like pronunciation, they tend to have a more accurate perception of English [18]. The causes are related to language anxiety and linguistic self-confidence [20].

5.5. Limitations

There are many limitations in this research which need to be improved. First of all, the sample size of this research is too small. What's more, considering the chosen subjects are confined to a specific group of age, and their ratio of gender is uneven. This study didn't take the number of years in an English-speaking country into account, which may lead to the fact that the results may not be strongly universal. Considering the article, some variables failed to be controlled. For example, whether the letter "i" appears in stressed syllables or not, whether the letter "i" exists only once in the words this study chose, and whether the scoring process is kind of too subjective.

For the future improvements, the most important thing is to expand the sample size. A more extensive age range should be included, and the number of years in an English-speaking country should be considered. If necessary, the samples need to be grouped based on age and the number of years being in an English-speaking country. When forming the article, it should be more rigorous in choosing the words and control the variables more carefully. The study needs to use a more thorough

and objective approach to assess pronunciation accuracy, such as applying the IPA software. If possible, the study needs to find the same amount of native English speakers as the observation group.

6.   Conclusion

Taking ten Chinese international students as subjects, this paper investigated the negative transfer of Chinese phonology on their English accents, taking the phoneme /ɪ/ as an example and the impacts of their pronunciation accuracy on accent perception. The results confirmed that Chinese international students tend to pronounce /ɪ/ as /i:/ due to the influence of Chinese phonology, and according to this research, this study didn't find an apparent correlation between their pronunciation accuracy and their perception of others' accents. Instead, this study found that their perception of others' accents is related to the self-confidence of their pronunciation. This study provides suggestions for English teaching, which means teachers should try their best to reduce the impact of Chinese phonology on Chinese students' English pronunciation. They should find out the differences between the alphabets of these two languages and pay special attention to the different phonemes. What's more, the results also provide advice for Chinese students who choose to learn English as their second language. That is, if they want to have a better perception of others' accents, improving their self-confidence in their pronunciation accuracy is a great way.

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