

Exploring Methods for Teaching English Pronunciation: A Study on Chinese ESL Learners

Yizhou Lan

*Faculty of International Studies
Nagoya University of Commerce and Business*

Abstract: Much has been written on native Chinese speakers' English pronunciation learning difficulties in the ESL context. However, there was a lack of adequate proposals of effective teaching methods, especially ones using cognitive teaching techniques. And these techniques often do not conform to L2 speech learning theories. The present study starts by describing Chinese learners' pronunciation of English /r/ and then attempts to propose a cognitive teaching method using phonetic theories to assist learners' understanding of correct articulation of English sounds. The present study involves a pronunciation accuracy test to describe the L2 speech and an attention-shifting treatment to experiment the cognitive teaching method. In the pronunciation test, participants read out monosyllabic English words containing /r/ in a carrier sentence before they were rated by native English listeners. In the cognitive treatment, participants were given theoretic instructions about the articulation of English /r/ and were asked to indicate their degree of understanding in a 1-7 scale after class. With the help of cognitive teaching methods, it was found that students gained better understanding as well as better pronunciation accuracy of the /r/ sound. The findings imply that the use of physical methods can effectively increase understanding reduce learner anxiety. Several specific follow-up classroom techniques of cognitive teaching were thus introduced.

Keywords: English Language Teaching, Pronunciation, English /r/, Cognitive Teaching Method, Learner Attention

1. Introduction

Being the most commonly spoken foreign language in mainland China as well as Hong Kong, English is the only compulsory foreign language subject in the curricula of both elementary and higher education (Xia, 2013; Hung, 2002). However, how English pronunciation should be taught in English classrooms in China has not been adequately studied. Some pronunciation teaching and learning studies (Derwing & Munro, 2005; Derwing, 2008; Munro & Derwing, 2008; Derwing & Munro, 2009) suggest that teachers should consider giving learners autonomy in selecting what aspects of L2 speech sounds to notice. They proposed that given proper teaching intervention, learners are tuned with attention and will thus pronounce L2 sounds more effectively.

However, pronunciation is indeed a difficult teaching task in the ESL classroom. Learners' difficulties in perceiving and producing L2 sounds originate from the transfer of sounds in their L1 (Mann & Liberman, 1983; Flege, 1995; Munro, et al., 1996; Diehl et al., 2004; Lan & Oh, 2012). Fossilized pronunciation errors occur even among highly proficient and fluent L2 speakers (Munro, et al., 1996; Derwing & Munro, 2005). Among many pronunciation problems of Chinese speakers, problems in producing /r/ in isolation as well as in cluster has been extensively explored in literature (Au, 2002; Hung, 2002; Chang et al., 2007; Chan, 2006; 2010; Lan & Oh, 2012). These previous studies had observed the substitution of /w/ or /l/ for /r/ in productions in isolation, and the insertion of schwa in the initial Cr- clusters. They had thus also analyzed the phonological and physiological reasons for these L2-accented productions. According to these studies, the reasons of substitution and insertion are two-fold: acoustical similarity and L1 phonological influence. Specifically, since /r/ does not exist in either Cantonese or Mandarin, the L1 influence of /w/ is evident. However, the instructions provided by these studies did not see direct and significant improvement in student performance, leaving these discussions in lack of effectiveness.

Another issue with the current ESL pronunciation literature is the lack of a connection between L2 phonology theoretical/empirical research and pronunciation teaching practice. Derwing & Munro (2005) have highlighted that many experimental studies are not designed to meet the needs for the classroom. Moreover, studies have not provided learning and training methods other than perceptual training tasks, nor have they mentioned which sounds are to be prioritized for teaching. The thesis attempts to apply experiment findings to the pronunciation classroom. Somewhat echoing this observation, many previous studies on English pronunciation by Chinese speakers (Gao, 2000; Lee, 2003) were some examples of these inadequacies stated above. The objectives of these studies are to examine Chinese speakers' phonetic competence/awareness in general. These studies were limited in identifying Chinese learners' difficulties on specific L1-L2 contrasts.

Several empirical studies on attention-shifting was done to examine if a cognitively based pedagogy was useful for pronunciation teaching (cf. a review by Strange, 2011). Generally, results of these studies support that learning could be more accurate when learner actively pays attention to the sound feature that distinguishes L1 and L2. When attention is introduced, the feature which grasp attention will be remembered by the speaker, and the weighting of the cue will be increased, thus helping to increase the rate of correct perception of cross-linguistic categories. Strange (2011) for the first time has put forward a comprehensive theoretical model called the Automatic Selective Perception (ASP) model with attention at the core of L2 speech learning

(Strange & Shafer, 2007; Strange, 2011). However, the actual effect of such teaching methods, and especially how it will enhance the learners' self-evaluation about their understanding, has seldom been touched upon, since these studies have all used purely objective measurements like accuracy rates and brain imaging protocols when testing the effectiveness of the attention-based training method (*ibid.*).

From the above review, we have seen an inadequacy in combining descriptive learner phonology and teaching strategies. Moreover, there has been a lack of cognitive teaching techniques used in the Chinese ESL classroom. With these research gaps in mind, the present study intends to investigate the pronunciation of /r/ sound by Chinese learners of English and how the correct pronunciation can be taught, primarily by testing the pedagogy of /r/ under a cognitive method of teaching that fosters learner attention. It also aims to see how learners subjectively view towards their understanding or achievement after the treatment, which is related to their motivations. Therefore, this empirical study has its significance in connecting the empirical evidence from literature and present data with actual classroom teaching techniques.

We have chosen two representative dialects of Chinese, Beijing Mandarin and Hong Kong Cantonese to represent "Chinese ESL learners" for the study. Three research questions concerning the descriptive and pedagogical facets of the research problem are identified below.

Q1. How do Cantonese and Mandarin advanced ESL learners produce and perceive English /r/? How accurate are those productions perceived by native English speakers?

Q2. With a treatment of instruction that targets at altering the attention of learners, how much can learners improve their pronunciation of /r/ and how much do they think they understand the subject matter?

Q3. Are there any pedagogical implications that can be drawn from the results and if so, can they be applied in teaching and learning?

To make practical use of the experiment results, this paper also intends to propose a few teaching techniques based on some of the participants' feedback in the production and perception tests. Based on those techniques, Pedagogical implications are made.

2. Method

The present study employs both quantitative and qualitative methods. The quantitative method refers to a native-speaker rating of non-native pronunciation and the qualitative, a survey regards a pedagogical treatment. In the pronunciation rating test, Chinese learners' pronunciations of /r/ were recorded and examined for accuracy rates by native listeners of English. Then, the cognitive pedagogical treatment was then given to the same group of participants followed by open-ended survey questions.

2.1 Participants

The participants are 10 Cantonese-speaking and 10 Mandarin-speaking college students in China (10 females, 10 males, mean age=27.5). They were all attending a university where the researcher used to work in and were advanced learners of English according to their TOEFL (>90) or IELTS (>6.5) results by the time of the experiment. They had started learning English from the age of 6 but had no exposure to other foreign languages except English. All participants were righthanded with no reported hearing or

speech defects. Control speakers were two native American English speakers (1 female and 1 male, mean age=26.5) from Canada.

Table1. Number of Tokens by Participant Groups.

Item	Total Number (M/F)	Sounds to be read	Number of tokens
Mandarin	10	/r/-initial, /r/-cluster and /w/	260
Cantonese	10	/r/-initial, /r/-cluster and /w/	260
English	2	/r/-initial, /r/-cluster and /w/	26

2.2 Stimuli

The same set of stimuli are used for the two pronunciation rating tests before and after the treatment. They are 18 words in CVC and CCVC syllable structures (e.g., rob and print respectively). The list of stimuli includes five words containing /r/-initials varying in five vowel contexts of /i, æ, u, ʌ, and ɔ/, and three words containing /r/ clusters, which were used as /r/- targets. Five /w/-initial words are added to the list as control sounds because of previously reported /r/-/w/ confusion by Chinese speakers in the literature mentioned in the previous section. Moreover, five other CVC words are inserted to the list as fillers in order to distract the subjects from finding out the purpose of the study. The wordlist is root, rob, read, rat, rub, print, train, cream, wok, wear, weak, wide, wake, cheap, dark, goat, cop and think, which are all meaningful and frequent words. The participants were checked that they understand the meanings of these words beforehand. See Table 1 for a description of the numbers of stimuli tokens by participants. Filler words are not analyzed in the data analyses.

2.3 Procedure

The quantitative study: Before the English class when the study took place, the participants were given a pronunciation test of the /r/ sound, which involves a recording of their pronunciation and evaluations of such by a native English listener. After class, and the participants were examined of their accuracy of /r/ pronunciation for a second time. Again, the productions were rated by a native English listener.

The qualitative study: In the English class when the study took place, the participants were given theoretic instructions about the articulation of English /r/ which involves cognitive input including giving hand gestures for tongue positions. Then the participants were asked to indicate their degree of understanding and answer open-ended questions in a questionnaire after class. Details of the procedures were layout below.

2.3.1. Accuracy of Pronunciation

As for the procedure of testing pronunciation accuracy, the participants need to complete a sentence-reading task including /r/ sound tokens, both before and after the treatment. Carrier sentences of “Now I say ____” were instructed to be read by participants. The recording was done in the researcher’s office in the university on a SONY HD recorder. Randomized stimuli words (18 words excluding fillers) were inserted to the blank and presented to participants. The number of tokens was 13 words × 20 participants (including Cantonese and Mandarin speakers) =260 for Speakers and 13 × 2 for English speakers. The productions of target words (including /r/-initials e.g., read, /r/-clusters e.g., greed and /w/-initials e.g., weed as control) were extracted from the sentences and segmented as phonemes within those words. The /r/ parts of the productions,

defined as the section from the beginning of voicing to the steady state of vowel, were examined by native phonetically-trained English listeners. Each sound token was given a right/wrong binary decision with a score of 1 and 0 respectively, and the cumulative scores, representing percentage of accuracy, were obtained for both the pre-test and post-test for each speaker.

2.3.2. Learner Perception of Understanding

As for the questionnaire, the participants were given a set of survey questions after the classroom treatment for both the pre-test and post-test. The participants were given complete privacy and anonymity to finish the questions. The survey questions were as following:

1. "How much do you think you understood the teacher's instruction?"
2. "Is the instruction helpful to your English pronunciation?"
3. "Is the teaching method difficult?"

All questions were given a 1-7 scale for choice and students were also free to leave open-ended comments on either of these questions. They were also asked to compare their answers with a traditional imitation-only teaching scenario, which was used earlier in the same class in their curriculum. These questions were designed to faithfully unveil their subjective self-reflection of their degree of understanding of the teaching method used in the treatment. The scaling was averaged for each question among participants and the verbal comments were given a content analysis of most common topics.

2.3.3. Treatment

The treatment of the current attention-shifting teaching method is described below. In the beginning of the pronunciation class, the instructor will give out a description of the /r/ sound verbally and physically:

"The English /r/ sound is a mid-central vowel and it contains three major gestures: tip-curling or raising (Tongue Tip), tongue body retracting (Tongue Body) and lip-rounding (Browman & Goldstein, 1992). It is the rest position of your tongue if you are an English speaker, but not the case for Japanese speakers". To ensure understanding, a somewhat 'iconic' treatment of analogy was shown to the participants, too: hand gestures, including various positions and bending directions of the hand, are used to imitate tongue positions."

The overall results of the questionnaire were shown in section 3.2 for three respective survey questions.

3. Results

3.1 Accuracy of Pronunciation

This section reports the quantitative results regarding learners' accuracy rates of the target /r/ sound and other related speech sounds. Overall, the pronunciation of /r/ by both Cantonese and Mandarin speakers has witnessed significant influence from L1, and differed from native English productions as viewed by the native English listeners. The native listeners had listened to the productions and had rated the productions respectively. Inter-rater reliability was high (80%) with a high rater confidence.

The Chinese speakers' pronunciation error pattern by accuracy rates was shown in a brief comparison of the accuracy rate statistics. The recordings of two groups of

students were segmented and examined by the researcher by a simple rating of binary decision. The numbers were counted with percentage of accuracy and compared before and after the treatment. The overall accuracy rate of /r/ is 62.5% by Cantonese and 67.5% by Mandarin speakers around chance level for the pre-test, among which 71.5% of /r/ initials and 58.5% of /r/ in clusters are correct for Cantonese speakers, and 61.5% and 71.2% for Mandarin speakers. However, the control sound /w/ was far more accurate, at 97% for Cantonese and 95% for Mandarin speakers. After the treatment, there was a significant improvement of the accuracy of /r/. The accuracy rate was 78% for Cantonese speakers, including 79.6% of /r/ initials and 76.8% of /r/ in clusters, and 76% for Mandarin speakers including 69.5% of /r/ initials and 79.5% of /r/ clusters. However, there was no significant improvement for /w/ in the post-test, with equally high accuracy rates at 96% for Cantonese and 95% for Mandarin speakers.

Among the incorrect tokens of /r/, the native English listener had identified them mostly as /w/ sounds (84% within the erratic tokens), and a scarcity of erratic tokens were identified as /l/ (11%) or others (5%). The raters and the researcher believe that this is due to a phonological gap between and the lack of attention as well as hearing sensitivity towards the F3 formant as the F3 is a critical formant that identifies /r/ with /w/ and /l/ (cf. Iverson et al., 2003).

3.2. Pedagogical Treatment and Feedback

This section reports the qualitative results of learners' perception of their understandings of the pedagogical treatment under query. All participants have responded to all rating section the survey questions in the survey and 11 out of 20 students had responded in the open-ended section. The common topics identified from a content analysis of those responses are detailed as follows.

In response to the first survey question "How much do you think you understood the teacher's instruction?", the participants had overall high ratings of the present cognitive method. According to their feedback, it is more iconic and easier for student to recall after they find confusion again in later production. Of all the questions in the questionnaire, the degree of understanding is overall 78.5% for the physical method (average rating 5.5), which is higher than the imitation only (average rating 2.6). Some participants expressed the ease to notice the obvious contrast of the target sound after repetitive listening to the words and by comparing the sounds with the printed words. Examples of this topic include remarks such as "the instructions helped me to notice something I have never noticed before" and "I did not know that language can be learned like mathematics".

Question 2 "Is the instruction helpful to your English pronunciation?" has also received highly positive responses by the participants with an average rating of 6.0. Most participants were impressed by the ease of digesting the knowledge in the instruction. More importantly, the attention-shifting for L2 input allowed learners to experiment with their articulators and learn through trial and error. Two participants responded respectively, "it gave me the chance to try different parts in my mouth and experiment with articulation", "I am not afraid of mistakes anymore because every time my pronunciation is closer to the right one".

For question 3 "Is the teaching method difficult?", most participants mentioned that the cognitive method is better than just acoustic training (average rating 5.7). One participant replied, "instead of a full acoustic-perceptual training by forced choice tasks,

presentation of minimal pairs in print spells out the sound differences, and hand gestures showing the pronunciation differences gave me kinesthetic instruction”, Some participants continued to mention that in doing so, phonetic contrasts available for the learner in more than one senses. Through such a way, learners become familiar with the L2 linguistic form by directly comparing their own speech with the native English speech.

In sum, the participants have generally shown a tendency of liking the cognitive method because of its simplicity, participation and involvement of physical movements instead of pure memorization.

4. Pedagogical implications

The findings suggest that although L1 Chinese did have influence on the accuracy of L2 production, the attention-based teaching methods can help learners to produce native-like sounds in the classroom. Based on the observations, the implication section introduces more possible cognitive methods to improve pronunciation teaching, and the methods will be especially beneficial for perception. Three teaching and learning skills for L2 pronunciation improvement are presented.

4.1 Training Phonological Awareness by Minimal Pairs

The first technique aims to improve the noticing for L1 phonological transfer by presenting minimal pair stimuli to learners. Basically, audio files and orthographic representations of minimal pairs contrasting problematic L2 sounds are presented repetitively to the learner. For example, minimal pairs like think-sink can be presented for Mandarin learners who cannot distinguish interdental fricatives; and bright-bite can be presented to Cantonese learners who tend to delete the /r/ in clusters. It is crucial that audio and orthographic stimuli are given to learners at the same time as it will push learners to reflect on their own speech by comparing similar pronunciations. This method may also help learners to cope with different L1-specific phonological ambiguities. For example, for Chinese learners, the minimal pair presentation can involve recorded sentences including different tone and intonation patterns. Instructors may guide learners to discriminate sound pairs with and without tonal information for comparison.

Through the minimal pair presentation to learners, comparison of target L2 contrasts will be highlighted with audio input, and the connection between the orthographic and audio forms of a word will be created in the learner’s mind . Learners can reflect on the difference of the native speaker’s and their own speech and discover the phonological contrast. The monitoring effect generated by the learner’s repeated listening will strengthen perceptual sensitivity (Munro, et al., 2015). Hence, it will be easier for the learner to internalize the lower-level input as metacognitive linguistic knowledge such as phonological awareness.

4.2 Altering Learner Attention Through Articulatory Gestures

The second technique is the altering of learner attention. Learner’s exposure to enough data to normalize their inter-language categorical formation is crucial to learning (Krashen & Terrell, 1983; Krashen, 1994). The effect of cue-weighting has been shown in the present experiment. The results suggest that attention might be one of the keys to improvement of L2 speech. The more difficult the perceptual difference is to be discovered, the more cognitive effort or attention is required of learners. Teachers may

guide learners in altering their hyper-/hypo- allocation of attention to unnecessary/important acoustic information.

According to the Automatic Selective Perception (ASP) Model, learners should shift their attention to distinctive dimensions of acoustic features of certain L2 phonemes. Once attention to the unattended dimension is achieved, learning becomes easier; and the corrected productions tend to be persistent rather than being short-lived (Strange & Shafer, 2007). The cognitive-based teaching method helps the learner shift the attention from native linguistic forms to non-native ones. For example, the interdental fricative /θ/ is usually realized distinctively as /f/ by Cantonese learners and /s/ by Mandarin learners. Both failed to notice dental feature of /θ/. If learners' attention is shifted towards the novel place of articulation, their learning problem might be resolved.

In order to help learners shift their perceptual attention to the L2 norm, a cognitive training tactic involving knowledge of articulation is proposed as an implication of the study. The knowledge of basic theory of articulatory phonetics could help students whose pronunciation have already been partly fossilized. These learners may have problems to manage correct pronunciation because of a lack of knowledge on exact variables to control articulation in general. For example, if students show problems of articulator control of the /r/ sound, the following attention-shifting approach may be attempted. The instructor could give out a description of /r/ sound: e.g., /r/ is an approximant, and there are two variations for initial /r/: curled /r/ and bunched /r/ by different varieties of English speakers. Also, it contains three major gestures: tip-curling or raising (tip of the tongue), tongue body retracting (body of the tongue) and lip-rounding. Then, the instructor could guide the learners to differentiate these gestures separately. Once the learners' attention was directed to the target gestures, they may find it easier to master the pronunciation.

4.3 Visual Aids and Pedagogy Design

Visual aids can also help learners overcome the problems in articulation. With the help of visual phonetics, we can design graphic representations of phonetic knowledge to ease the students' burden for learning theory directly because the whole system of phonetics maybe too informative for language learners and the textual introduction seems tedious and scattered. A pioneering example was a Spanish pronunciation learner's helper created by Barrutia (1970), which symbolizes dimensions of articulation with a triangular diagram. It can be easily adapted catering to English pronunciation learners. For the same purpose, the present study also suggests a systematic use of hand gesture to imitate tongue positions. It might be more iconic and easier for learners to recall if they find the auditory input not effective.

Pedagogically, pronunciation trainers should pay more attention to re-occurring errors and be more tolerant to errors, because the errors may be unstable according to environmental factors. Multi-talker and multi-tokens should be used to ensure the variability of speech, and specific instruction of gestural movements, in addition to general gestural setting, should be given to students.

5. Conclusions

The present study examined the pronunciation of /r/ in Cantonese and Mandarin speakers as well as identified and analyzed their non-native pronunciation patterns, whose non-native nature can be linked to the lack of attention to language-specific L2 features. To tackle this problem, we attempted to utilize the cognitive teaching method such as

theoretical inputs of simple phonetic knowledge. As shown in the comparison of accuracy before and after the treatment, the results supported the hypothesis that cognitive training enhances learner understanding, pronunciation accuracy, as well as motivation.

Admittedly, the study has limited numbers of participants as well as L2 sound contrasts, and focuses solely on the production of L2 speech. In light of these limitations, future work will include establishing the link between F3 sensitivity and learner perception/production problem and that requires more robust audio-manipulation experiments for learner perception. A follow-up study will take that into account. Also, the methods listed in the implication section need more tests as treatments to see if a combination of them may contribute better learner understanding and, eventually, better L2 pronunciation.

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