RESEARCH ARTICLE

An Empirical Study on Cantonese Upper-intermediate ESL Learners’ Production of English Word-final Plosives

Yining, Song
Lecturer, School of Foreign Languages, Taiyuan University of Science and Technology, Taiyuan, Shanxi, China
Corresponding Author: Yining, Song, E-mail: songyining@tyust.edu.cn

ABSTRACT

This paper sets out to examine the pronunciation problems encountered by Cantonese upper-intermediate ESL learners when they are producing English word-final plosives. The primary goal is to identify the basic error pattern and uncover influencing factors. Empirical data were collected in a controlled speech production experiment. Based on the transcription of speech data, the researcher classified the word-final plosives that are not fully retained into four types, namely devoiced, unreleased, deleted and others. The data indicate that the subjects performed much better in the production of voiceless word-final plosives and they are prone to substituting voiced plosives with voiceless ones. It is also found that the subjects tend to omit the release stage of English word-final plosives. In addition, the word-final plosives were totally deleted or pronounced as other irrelevant phonemes in a few cases. It is suggested that the errors of devoicing and unreleasing can be largely attributed to the interference of Cantonese. In light of the findings, remedial teaching programs can be designed and implemented to facilitate Cantonese ESL learners’ overcoming of these problems.

KEYWORDS
Cantonese upper-intermediate ESL learners; English word-final plosives; Error pattern; Cantonese Interference

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1. Introduction

English and Chinese are two typologically distant languages. English is a member of the sub-group of Indo-European language family, whereas Chinese belongs to the Sino-Tibetan language family. As a dialect of Chinese, Cantonese is widely spoken in the province of Guangdong, parts of Guangxi, Hong Kong and Macau and serves as the lingua franca in overseas Chinese communities (Yule, 1985). In the case of Hong Kong, most people learn Cantonese as their first language and English as their second language. In both English and Cantonese, there are six plosives which can be divided into three groups: the bilabial plosives /p, b/, alveolar plosives /t, d/ and velar plosive /k, g/ (Chan & Li, 2000).

Despite the similarities, two fundamental differences exist in these plosives between English and Cantonese. The first major difference involves voicing. In English, /b, d, g/ are voiced as the vocal cords of the speakers are vibrating when they are pronounced, while /p, t, k/ are voiceless since no vocal cords vibration is involved. In Cantonese, by contrast, all plosives are voiceless and there are no voiced plosives. That is to say, it is aspiration rather than voicing that distinguishes /p, t, k/ from /b, d, g/ (Radford, 2009).

The other difference between English and Cantonese plosives lies in the stage of articulation. Basically, the articulation of plosives consists of three stages: closing stage, closure stage and release stage. In the closing stage, the active articulator is raised to come in contact with the passive articulator. In the next stage, the articulators remain in contact and the air builds up behind the blockage. In the stage of releasing, the active articulator is lowered to allow the air to be released with some force. If a plosive is produced...
with only the first two stages, it is unreleased (Matthews & Yip, 1994). In English, all the plosives can occur in word-final position and they can be either released or unreleased. In contrast, only three plosives /p, t, k/ in Cantonese may occur in word-final position and they are typically not released. This explains why it sounds as if the final plosive in Cantonese is “swallowed”. For example, in the word 鴨(‘duck’, /a:p/), the lip of the speaker is closed in the formation of /p/ but not opened again to allow any release of air (Chan & Li, 2000).

In the previous studies, Chan and Li (2000) outlined the major learner problems and difficulties arising from Cantonese influence by examining the phonological differences between Cantonese and English at the segmental and suprasegmental levels. Peng and Setter (2000) analyzed the morphophonemic alternations in the English interlanguage spoken by native speakers of Cantonese and discussed the phenomenon of terminal devoicing among Cantonese speakers, yet their study was restricted to the alveolar plosives /t/ and /d/. Deterding, Wong, and Kirkpatrick (2008) surveyed fifteen English-major female subjects and found that fifty-four percent of final plosives from word-final consonant clusters were omitted. However, very few studies focused on Cantonese ESL learners’ pronunciation of word-final plosives. The present study tentatively explores how Cantonese upper-intermediate ESL learners produce English word-final plosives with the aim of identifying the basic error pattern and revealing contributing factors to the different types of errors.

2. Methodology
To address the research questions, the following controlled speech production experiment was designed and conducted.

2.1. Subjects
Twenty-six subjects (eleven males and fifteen females) who speak Cantonese as their first language and have been learning English as their second language for over fifteen years were selected for the experiment. Other criteria are listed below:

(1) The subjects all attended English-medium high schools and have received tertiary education or above in Hong Kong.
(2) The English proficiency of the subjects is deemed to be at upper-intermediate level on the basis of their above average English score obtained in public examinations such as Hong Kong Advanced Supplementary Level Examination.
(3) The subjects have not had any experience of studying or living in an English-speaking country for more than six months.
(4) The subjects have not taken any courses in Linguistics or received any forms of phonetic training before.

2.2. Data
A list of fifteen sentence stimuli as can be seen in Table 1 was created for this study. Since the production of plosive can be largely influenced by its neighbouring sounds, the researcher ensured that the target plosive was preceded by a vowel and the word with the target plosive was put at the end of the sentence. In accordance with these rules, six minimal pairs contrasting /p/ with /b/, /t/ with /d/, /k/ with /g/ in the final position such as rope and robe were embedded at the end of twelve sentences. Three other sentences ending with other phonemes instead of plosives were also included in the list. To minimize the influence of other variables, all sentences were made up of common everyday English words.

| /p/ v.s. /b/                      | 1. Speaking English is a feather in your cap.  
|                                 | 2. You should just take a cab.            
|                                 | 3. He made a snatch at the rope.          
|                                 | 4. She put on a robe.                     |
| /t/ v.s. /d/                    | 1. He likes to ride in his cart.          
|                                 | 2. You can pay by credit card.            
|                                 | 3. It doesn’t matter whether he comes or not.  
|                                 | 4. He gave her a nod.                     |
| /k/ v.s. /g/                    | 1. She was born and raised in the same block.  
|                                 | 2. I’m still updating my blog.            
|                                 | 3. The gas has been turned off because of a gas leak.  
|                                 | 4. They are so out of my league.          |
| Others                         | 1. The area is rich in wildlife.          
|                                 | 2. England is the birthplace of the modern novel.  
|                                 | 3. She has won a place in the Olympic team. |

Table 1 A list of sentence stimuli with word-final plosives
Speech data were collected in a quiet room and a high-quality microphone was fixed near the subject’s mouth and connected to a computer. Before the experiment, the subjects were given the following instructions on a PowerPoint slide “On each of the following slide, you will see one English sentence. Please read the sentences aloud at natural speed and pause between sentences”. Then the fifteen sentence stimuli were presented to each subject one by one in random sequence and the speech data were recorded directly on to the computer.

3. Results and Discussion

After the experiment, the researcher and another scholar with linguistics background listened to the speech data and transcribed all the 312 target plosives separately. For each case of disagreement, the recording was replayed until a consensus was reached. Based on the transcription, the researcher classified the target plosives that were not fully retained into the types of devoiced (for voiced plosives only), unreleased, deleted and others (for plosives pronounced as other irrelevant phonemes) so as to reveal the basic error pattern. The classification of the production of word-final plosives and the number and percentage of each type are shown in Table 2 below.

<table>
<thead>
<tr>
<th>Plosives</th>
<th>Retained</th>
<th>Devoiced</th>
<th>Unreleased</th>
<th>Deleted</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/</td>
<td>22(42%)</td>
<td>---</td>
<td>27(52%)</td>
<td>0(0%)</td>
<td>3(6%)</td>
<td>52</td>
</tr>
<tr>
<td>/b/</td>
<td>6(12%)</td>
<td>18(35%)</td>
<td>25(48%)</td>
<td>0(0%)</td>
<td>3(6%)</td>
<td>52</td>
</tr>
<tr>
<td>/t/</td>
<td>43(83%)</td>
<td>---</td>
<td>5(10%)</td>
<td>4(8%)</td>
<td>0(0%)</td>
<td>52</td>
</tr>
<tr>
<td>/d/</td>
<td>11(21%)</td>
<td>20(38%)</td>
<td>19(37%)</td>
<td>1(2%)</td>
<td>1(2%)</td>
<td>52</td>
</tr>
<tr>
<td>/k/</td>
<td>48(92%)</td>
<td>---</td>
<td>2(4%)</td>
<td>0(0%)</td>
<td>2(4%)</td>
<td>52</td>
</tr>
<tr>
<td>/g/</td>
<td>11(21%)</td>
<td>26(50%)</td>
<td>8(15%)</td>
<td>3(6%)</td>
<td>4(8%)</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>141(45%)</td>
<td>64(20%)</td>
<td>86(28%)</td>
<td>8(3%)</td>
<td>13(4%)</td>
<td>312</td>
</tr>
</tbody>
</table>

It can be seen from Table 2 that the majority (55%) of the 312 target plosives were not fully retained, most of which fell into the categories of devoiced and unreleased. In addition, 7% of the target plosives were totally deleted or pronounced as other irrelevant phonemes.

In terms of voicing, the subjects performed much better in the production of voiceless plosives /p, t, k/ than in that of voiced plosives /b, d, g/. On average, 72% of voiceless plosives were fully articulated. In contrast, only 18% of voiced plosives were retained and 41% of them were devoiced. Since all plosives are voiceless in Cantonese, Cantonese ESL learners tend to transfer the articulatory habits of not vibrating vocal cords to English. Therefore, the phonological difference of voicing between the two languages verifies the subjects’ better performance in producing voiceless plosives and their devoicing of voiced plosives.

As to the stage of articulation, it should be noted that 28% of target plosives were unreleased. The percentages of unreleased /p/ and /b/ were as high as 52% and 48%. That is to say, the subjects only performed the first two stages of articulation and failed to allow the air to be released, resulting in unreleased plosives. This can be largely ascribed to the interference of Cantonese as well due to the fact that all word-final plosives are unreleased in Cantonese.

Although these two findings generally conform to previous studies (Chan, 2006; Chan & Li, 2000), there is another finding that is different from the claim of Deterding, Wong, and Kirkpatrick (2008). In their research, they reported that 54% of final plosives from word-final consonant clusters are deleted. But as few as 3% of the word-final plosives were deleted in the current study. Upon further analysis, two factors may contribute to this. Firstly, the low percentage of deleted word-final plosives may be affected by the surroundings of the plosives. Unlike the final plosives in the consonant clusters, there is only one vowel and no consonant immediately before the target plosives. The other factor that should be considered is the position of the word-final plosives. It is reasonable to assume that the subjects would be more conscious of the word-final plosives when they are placed at the end of the sentence and less likely to omit them.

4. Conclusion

This study probed into Cantonese upper-intermediate ESL learners’ production of English word-final plosives. On the basis of empirical speech data and phonological analysis, the study identified the general error pattern and explored possible affecting factors, yet there are still several limitations.

Firstly, it is argued that when native speakers produce word-final plosives, they also tend to omit the release stage, especially in less formal speech. Therefore, a control group consisting of native speakers should be added to help determine whether Cantonese ESL learners’ unreleasing of word-final plosives can be solely attributed to the influence of their first language.
Secondly, the fact that this study relies too much on human judgment may lead to inconsistent and inaccurate transcription of the speech data. In future studies, phonetic software ought to be used and systematic phonetic training should be offered to the judges to increase the reliability of data transcription.

Thirdly, given that this study only focuses on Cantonese ESL learners at upper-intermediate level, it is still unknown whether similar results will be found in learners at lower or more advanced level. More studies need to be done to reveal the whole picture of this language phenomenon.

In spite of these limitations, this study will be helpful, at least to some extent, in raising Cantonese ESL teachers’ and learners’ awareness of the potential errors they are prone to make and informing them of the sources of these problems. It is also hoped that this study can provide fellow researchers with new insights into the design and implementation of remedial teaching programs to facilitate Cantonese ESL learners’ learning of English word-final plosives.

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