Difficulties with Mandarin Tones: Learners’ Perspectives and Speech Data Analysis

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TAL 12, Nanjing, China, May 2012
Abstract

This study investigates beginning level adult Chinese as a Foreign Language (CFL) learners’ difficulties with Mandarin Chinese tones. Twenty CFL learners enrolled in a first semester CFL course in a U.S. university participated as speakers. Their productions of Mandarin phrases and sentences were judged by native Mandarin listeners for pronunciation and tone problems and were also rated by native Mandarin listeners. A post course survey questionnaire was also analyzed to investigate the learners’ learning experience and their perception of difficulties with Mandarin pronunciation and tones. Results suggest the speakers’ productions of Mandarin phrases and sentences were judged to be most problematic with tones. Learners also reported tones to be the most difficult aspect in learning Chinese at initial stage of learning.
Background

- **Chinese**: the most difficult foreign language for western students?
- **Which aspects** of Chinese learning cause particular difficulties for learners? (Chiang, 2002; Hu, 2010).
- Very few studies have investigated the learners’ difficulties with pronunciation, in particular, the lexical tones.
Previous Studies: Perception

Test & Training

- Wang et al. (1999):
  - Perceptual training that focused on individual syllables under lab conditions was effective.

  - Perceptual and production training were both effective for learning individual Mandarin tones.

- Wang (2012):
  - Native Hmong speakers, whose L1 contrasts lexical tones, performed significantly worse than native English and native Japanese speakers who had no L1 experience with lexical tones.
Huang 2002

• Participants: 15 (6 English and 9 Cantonese speakers) intermediate to advanced learners of Chinese

• Method: Survey and Classroom observation:
  ◦ Survey: rank eight areas of difficulties: pronunciation; tones; grammar; writing Chinese characters; vocabulary building; oral communication; delivering a prepared oral presentation; and written compositions

• Results:
  ◦ Learners’ L1 background had a huge effect on the major difficulties as they perceived:
  ◦ The Cantonese speakers reported pronunciation (78%) and tone (56%) as their major difficulties.
  ◦ None of the 6 English speakers chose tone as their major problem.
Chiang (2002)

- **Participants**: 26 intermediate level students in Princeton in Beijing summer program (8 week program)
- **Method**: Survey questionnaire with 3 questions:
  - Which aspects of learning Chinese are easy or difficult for you?
  - Imagine that you had the opportunity and time to learn Chinese from the beginning again, What would you like to do first of all?
  - Teacher-student vs. Student-student interaction
- **Results**:
  - *Tones*, speaking, and vocabulary retention are more difficult than character writing.
  - *Tones did not become easier at the intermediate level*.
  - Students wished they had paid more attention to tones (48%), character-writing (16%) practiced pattern/grammar more (16%), established good habit (12%), and knew more about radicals and components of characters (8%).
The Current Study

- **Research questions:**
  1. What are beginning level CFL learners’ speech production problems with Mandarin Chinese?
  2. Which aspects of Mandarin Chinese language or skills are perceived as the most difficult for beginning level CFL learners?

- **Two studies were conducted:**
  - Post Course Survey
  - Speech Data Analysis:
    - Perceptual Identification test
    - Goodness Rating
Survey Study

- Participants
  - 20 beginning level CFL students (taking the 1st semester Chinese course) with different L1 background (Table 1)
- Post course survey (10 questions)
  - Question 1-5: SS background information
  - Question 6-10: SS learning experience, difficulties
- Analysis of Survey questionnaire:
  - Percentage
  - Rank order
Table 1. Participants’ Background Information

<table>
<thead>
<tr>
<th>ID</th>
<th>Gender</th>
<th>L1</th>
<th>Age</th>
<th>ID</th>
<th>Gender</th>
<th>L1</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>C01</td>
<td>M</td>
<td>Cantonese</td>
<td>20</td>
<td>H01</td>
<td>F</td>
<td>Hmong</td>
<td>20</td>
</tr>
<tr>
<td>C02</td>
<td>M</td>
<td>Cantonese</td>
<td>19</td>
<td>H02</td>
<td>F</td>
<td>Hmong</td>
<td>19</td>
</tr>
<tr>
<td>C03</td>
<td>M</td>
<td>Cantonese</td>
<td>19</td>
<td>H04</td>
<td>F</td>
<td>Hmong</td>
<td>20</td>
</tr>
<tr>
<td>E01</td>
<td>M</td>
<td>English</td>
<td>26</td>
<td>H05</td>
<td>F</td>
<td>Hmong</td>
<td>20</td>
</tr>
<tr>
<td>E02</td>
<td>M</td>
<td>English</td>
<td>28</td>
<td>H06</td>
<td>M</td>
<td>Hmong</td>
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</tr>
<tr>
<td>E03</td>
<td>F</td>
<td>English</td>
<td>21</td>
<td>H07</td>
<td>F</td>
<td>Hmong</td>
<td>19</td>
</tr>
<tr>
<td>E04</td>
<td>M</td>
<td>English</td>
<td>22</td>
<td>J01</td>
<td>F</td>
<td>Japanese</td>
<td>23</td>
</tr>
<tr>
<td>E05</td>
<td>M</td>
<td>English</td>
<td>19</td>
<td>S01</td>
<td>F</td>
<td>Spanish</td>
<td>19</td>
</tr>
<tr>
<td>E06</td>
<td>F</td>
<td>English</td>
<td>18</td>
<td>V01</td>
<td>M</td>
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<td>E07</td>
<td>M</td>
<td>English</td>
<td>38</td>
<td>V02</td>
<td>F</td>
<td>Vietnamese</td>
<td>19</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22</td>
</tr>
</tbody>
</table>
Results

- *Pronunciation* was the most difficult aspect of learning.
- *Tone* was the most difficult aspect of pronunciation.
- Character and Grammar were not a problem for most learners.
- Tones also mattered the most for intelligibility, as perceived by the learners.
- However, participants did not prioritize instruction on tones, given the choice. (See Table 2)
Table 2. Results of the survey study

Which of the following is the most difficult for you in learning Chinese?

<table>
<thead>
<tr>
<th></th>
<th>Pronunciation</th>
<th>Characters</th>
<th>Grammar</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pronunciation</td>
<td>80</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Which of the following is the most difficult for you in learning Chinese pronunciation?

<table>
<thead>
<tr>
<th></th>
<th>Tones</th>
<th>Initial Cons.</th>
<th>Vowels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tones</td>
<td>70</td>
<td>25</td>
<td>5</td>
</tr>
</tbody>
</table>

Which is more important for you in making yourself understood by the listeners?

<table>
<thead>
<tr>
<th></th>
<th>Tones</th>
<th>Initial Cons.</th>
<th>Vowels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tones</td>
<td>80</td>
<td>20</td>
<td>0</td>
</tr>
</tbody>
</table>

Which of the following was emphasized the most in class?

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th>Pronunciation</th>
<th>Listening</th>
<th>Speaking</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pronunciation</td>
<td>30</td>
<td>25</td>
<td>10</td>
<td>20</td>
<td>15</td>
</tr>
</tbody>
</table>

Which of the following do you want to have more practice in class?

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th>Pronunciation</th>
<th>Listening</th>
<th>Speaking</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pronunciation</td>
<td>10</td>
<td>20</td>
<td>25</td>
<td>10</td>
<td>35</td>
</tr>
</tbody>
</table>
Perception Test

- **Speech data:**
  - Participants’ productions of phrases and sentences (final oral exam) with familiar vocabulary from the textbook
  - 2 phrases and 2 sentences were selected from a reading list:
    - 你好 Nihao ‘hello’
    - 生日 Shengri ‘birthday’
    - 我爸爸是老师。 ‘My father is a teacher’
    - 今天几月几号? ‘What date is today?’
  - Individual recording sessions were made in a sound booth.
  - Each student was given 2-3 minutes to prepare before the recording.
• **Listeners:**
  ◦ 6 (3 male, 3 female) native Mandarin listeners living in the US.

• **Procedure:**
  ◦ Individual listening identification and rating sessions were performed on a Mac Computer using Praat speech software.
  ◦ 5-way forced choice Identification task to determine the type of speech problems: **Tone, Sounds, Both, Other, None**
  ◦ In the same trial after the identification task, the listeners also rated the overall pronunciation of the phrase/sentence along a scale of 1 (poor) – 7 (good).
  ◦ Listeners could replay the stimulus up to three times to make a decision.
Results

- The mean error scores:
  - 43% for Tones, (See Table 3)
  - 10% for Sounds,
  - 5% for Other, and 13% for Both tones and sounds.
- Combing the problems with both tones and sounds with those identified with Tones and Sounds only, 56% and 23% of the speech had problems with tones and sounds respectively. (Table 3)
- Thirty percent of the speech was perceived as no problems by the native listeners.
Table 3. Mean % of speech problems as identified by native listeners

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Tones</th>
<th>Sounds</th>
<th>Other</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>你好</td>
<td>41</td>
<td>49</td>
<td>3</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>生日</td>
<td>22</td>
<td>33</td>
<td>19</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>我爸爸是老师</td>
<td>38</td>
<td>45</td>
<td>10</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>今天几月几号</td>
<td>19</td>
<td>43</td>
<td>8</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Mean</td>
<td>30</td>
<td>43</td>
<td>10</td>
<td>5</td>
<td>13</td>
</tr>
</tbody>
</table>
Results

- **Goodness Rating:**
  - Overall rating score was between the range of 3.8-4.9 on the scale of 1-7 (1= poor and 7= good)
  - There were some differences between the two phrases and 2 sentences. (Table 4)
  - The listeners were able to tell the native and nonnative productions for most of the stimuli they heard.
Table 4. Mean Rating Scores by Each Listener (1=poor, 7=good)

<table>
<thead>
<tr>
<th></th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>你好</td>
<td>4.9</td>
<td>5.2</td>
<td>4.3</td>
<td>5.6</td>
<td>5.1</td>
<td>4.5</td>
<td>4.9</td>
</tr>
<tr>
<td>生日</td>
<td>3.5</td>
<td>3.2</td>
<td>3.3</td>
<td>4.4</td>
<td>3.9</td>
<td>4.6</td>
<td>3.8</td>
</tr>
<tr>
<td>我爸爸是老师</td>
<td>3.7</td>
<td>5.2</td>
<td>4.3</td>
<td>5.5</td>
<td>4.6</td>
<td>5.1</td>
<td>4.7</td>
</tr>
<tr>
<td>今天几月几号</td>
<td>3.4</td>
<td>3.5</td>
<td>3.3</td>
<td>3.8</td>
<td>4.6</td>
<td>4.9</td>
<td>3.9</td>
</tr>
</tbody>
</table>
Discussion

- **Pronunciation** was more difficult than other aspects of learning for beginning level learners.
- **Tone** was perceived as the most difficult aspect of learning.
- Speech perception by native listeners confirmed the learners’ problems with tones.
- Speech sounds, especially some initial consonants were also problematic for learners: e.g. 生日，今天几月几号？
- Some vowels are also difficult for the learners, although phonetic analyses are needed for more details of such problems.
- However, learners’ own perceptions of problems with tones far exceeded their problems with Mandarin sounds.
Instruction emphasis and learning problems:

- Although pronunciation, especially tones, were perceived as the most difficult aspect of learning, students did not choose to receive more instructions on pronunciation, when given the choices. (See Table 2)

- In a comprehensive course that emphasizes four skills for communicative purposes, pronunciation is generally not the priority after the first 3 weeks of instruction.

- Mandarin tones are difficult to master in perception and production for beginning level learners.

- Tone training is effective for learning tones (Wang, 2008, 2012).
Pedagogical Implications

- What to teach and how to teach the first semester CFL course?
  - Four skills in the CLT frame as ESL?
  - How about character recognition and writing?
  - How about tones and difficult sounds?
- In a beginning level CFL course, what should be the priority?
- “Tonal acquisition and importance of tonal accuracy should be addressed to every CFL teacher trainer, material writer, and test developer. For true beginners, getting control of tones, tone combinations, tone sandhi rule, building a habit of listening to tones, memorizing tones, and using tones take more than a couple of days, weeks, or even months.” (Chiang, 2002, p.12)
Conclusions

- Beginning level CFL learners chose pronunciation as the most aspect of learning.
- Lexical tones were the most difficult aspect of learning in terms of pronunciation.
- Perceptual test confirmed the learners’ problems with tones and pronunciation.
- Learners did not choose pronunciation at the top of the list for aspects that they want “more practice” in classroom.
- CFL teachers face serious challenges in teaching pronunciation and tones.
- Curriculum design needs to take these factors into consideration.
References


