Using Chinese EFL Errors to Solve Issues in Mandarin Phonological Structure

[Image 66x532 to 287x698]

OUTLINE

1. Introduction
   - Perspectives on L1 transfer
   - Key issues
     1. Mandarin rime structure
     2. Status of the Mandarin alveopalatals

2. ISSUE 1: Mandarin rime structure
   - Possible rimes in Mandarin
   - Proposed Rime structures
   - Evidence from Mandarin L1 transfer
   - Parallels in neighboring languages
     1. Cantonese
     2. Vietnamese

3. ISSUE 2: Status of the Mandarin alveopalatals
   - Problem of complementary distribution
   - Proposed groupings
   - View from interlanguage phonology

Perspectives on L1 phonological transfer

- Traditional perspective:
  - How L1/L2 phonological structure affects L2 acquisition
  - Minimize negative L1 transfer in L2 acquisition (so as to achieve more native-like pronunciation)
  - Contrastive Analysis Hypothesis (CAH) (Lado 1957:2)
  - Markedness Differential Hypothesis (MED) (Eckman 1977:61)
  - Speech Learning Model (Flege 1987)

- New perspective:
  - What can L1 phonological transfer tell us about the phonological structure(s) of L1/L2
  - (Non-pedagogical) purpose is to shed light on language structure

KEY ISSUES

1. Mandarin syllable structure
   - rime structure
   - Phonemic status of the Mandarin alveopalatals
     - alveopalatals tɕ, tɕʰ, s in complementary distribution with
       1. alveolar sibilants
       2. retroflex initials
       3. velar initials

ISSUE 1: Mandarin syllable structure
(basic syllable, no diminutive suffix)

syllable

<table>
<thead>
<tr>
<th>initial</th>
<th>medial</th>
<th>nucleus</th>
<th>coda</th>
</tr>
</thead>
<tbody>
<tr>
<td>(鳥)</td>
<td>n</td>
<td>j</td>
<td>a</td>
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</tbody>
</table>
Possible Mandarin rimes

- Possible (complex) rimes in Mandarin (non-rhotic syllables only)
  - VG: aj, aw, əj, əw
  - VN: an, əŋ, ən, əŋ

Hierarchical rime structure

- PROPOSALS
  1. Branching nucleus
  2. Branching coda
  3. Non-branching

RIME STRUCTURE (1):
Branching nucleus (Lin 1989)

RIME STRUCTURE (2):
Branching coda (C. Cheng 1973)
RIME STRUCTURE (2): Branching coda (C. Cheng 1973)

Which hierarchical rime structure?

- Evidence from L1 phonological transfer
Evidence from L1 phonological transfer

- **OBSERVATION**: Chinese ESL learners difficulty producing diphthong plus consonantal coda
  - Huang and Radant (2009)
    - Taiwanese ESL students can articulate [ei] correctly in words such as play and day; strangely, it is quite common that they pronounce [kæ] as [k[ei]] or [kat] as [k[æ][t]] (2009: 112)
    - “same is pronounced [lën]; safe is pronounced [sæf]; sale is pronounced [sæl]; sane is [sæn]” (2009: 113)
    - “town is pronounced [tʊn]” (2009: 113)

- **OBSERVATION**: Chinese ESL learners difficulty producing diphthong plus consonantal coda
  - S. Chang (2008)
    - [Taiwanese ESL learners’ pronunciation of English /ej/]
    - Closed syllables (61% accurate) inhibit accurate pronunciation of [ej] (2008: 45)
    - Open syllables (86% accurate) promote accurate pronunciation of [ej] (2008: 45)
    - Attributed to transfer of L1 phonotactics – Mandarin /ej/ appears only in open syllables (2008: 12-13; 61-62)

- **OBSERVATION**: Chinese ESL learners difficulty producing diphthong plus consonantal coda
  - An (2007)
    - [Taiwanese ESL learners’ pronunciation of English diphthong /aw/]
    - diphthong [aw] tends to be pronounced correctly in open syllables (2007: 42)
    - diphthong [aw] tends to be reduced to [a] in syllables closed by nasals, e.g., “down” (2007: 43)
    - the phenomenon is so prevalent that not only learners, but even language teachers say [dën] instead of [dën] (2007: 4)

- **OBSERVATION**: Chinese ESL learners difficulty producing diphthong plus consonantal coda
  - INTERPRETATION:
    - evidence for non-branching nucleus and coda

- Adaptation of ENGLISH “sane” into branching nucleus rime structure

- Adaptation of ENGLISH “sane” into branching coda rime structure

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Fig. 12 Rime [e[j] positioned within Lin’s (1989; 2007) model of Mandarin rime

Fig. 11 Rime [e[j] positioned within C. Chang’s (1973) model of Mandarin rime
Evidence from L1 phonological transfer

- Adaptation of ENGLISH “sane” into **non-branching** rime structure
  - Conclusion:
    - branching nucleus structure (OK)
    - branching coda structure (OK)
    - non-branching structure (*incompatible*)
  - Branching nucleus and branching coda structures erroneously predict that Chinese native speakers would not have trouble with rime [ejn]
  - Only non-branching structure predicts that Chinese native speakers cannot produce rime [ejn]

Evidence from L1 phonological transfer

- Adaptation of ENGLISH “town” into **branching nucleus** rime structure

Evidence from L1 phonological transfer

- Adaptation of ENGLISH “town” into **branching coda** rime structure

Evidence from L1 phonological transfer

- Adaptation of ENGLISH “town” into **non-branching** rime structure
Evidence from L1 phonological transfer

- Adaptation of ENGLISH “town” into non-branching rime structure

![Diagram of a non-branching rime structure](image)

Evidence from L1 transfer

- Adaptation of ENGLISH “town” into non-branching rime structure

![Diagram of a non-branching rime structure](image)

Evidence from L1 transfer

- Adaptation of ENGLISH “town” into non-branching rime structure

- Conclusion:
  - branching nucleus structure (OK)
  - branching coda structure (OK)
  - non-branching structure (* incompatible)

- Branching nucleus and branching coda structures erroneously predict that Chinese native speakers would not have trouble with rime [awn]
- Only non-branching structure predicts that Chinese native speakers cannot produce rime [awn]

Parallels in neighboring languages: CANTONESE

- Possible rimes in CANTONESE:
  - VG: vowel plus glide j or w
  - VN: vowel plus nasal m, n or η
  - VC: vowel plus stop p, t or k

Parallels in neighboring languages: CANTONESE

- OBSERVATION: Cantonese ESL learners difficulty producing diphthong plus consonantal coda
  - Cantonese diphthongs occur only in the final position, i.e., in open syllables. …
  - (Cantonese speakers have problem pronouncing English diphthongs with full glide in closed syllables.)

Parallels in neighboring languages: CANTONESE

- OBSERVATION: Cantonese ESL learners difficulty producing diphthong plus consonantal coda
  (L. Chang 1975: 232)
  - ADAPTATION STRATEGY 1: Incomplete glide

<table>
<thead>
<tr>
<th>Glide (LRG)</th>
<th>Target language pronunciation</th>
<th>Interlanguage pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>same</td>
<td>sejm</td>
<td>sem</td>
</tr>
<tr>
<td>home</td>
<td>howm</td>
<td>hom</td>
</tr>
</tbody>
</table>
**Parallels in neighboring languages: CANTONESE**

- **OBSERVATION:** Cantonese ESL learners difficulty producing diphthong plus consonantal coda (L. Chang 1975: 233)

  - **ADAPTATION STRATEGY 2:** Final consonant omission

<table>
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<th>Gloss (ENG)</th>
<th>Target language pronunciation</th>
<th>Interlanguage pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>out</td>
<td>awt</td>
<td>aw</td>
</tr>
<tr>
<td>time</td>
<td>tajm</td>
<td>taj</td>
</tr>
<tr>
<td>five</td>
<td>fajv</td>
<td>faj</td>
</tr>
</tbody>
</table>

**Parallels in neighboring languages: VIETNAMESE**

- **OBSERVATION:** Vietnamese ESL learners difficulty producing diphthong plus consonantal coda (Benson 1988: 228)

  - **ADAPTATION STRATEGY 2:** Final consonant omission

<table>
<thead>
<tr>
<th>Gloss (ENG)</th>
<th>Target language pronunciation</th>
<th>Interlanguage pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>like</td>
<td>lajk</td>
<td>laj</td>
</tr>
<tr>
<td>right</td>
<td>aajt</td>
<td>aaj</td>
</tr>
<tr>
<td>out</td>
<td>awt</td>
<td>aw</td>
</tr>
<tr>
<td>down</td>
<td>dawn</td>
<td>daw</td>
</tr>
<tr>
<td>late</td>
<td>lejt</td>
<td>lej</td>
</tr>
<tr>
<td>eight</td>
<td>ejt</td>
<td>ej</td>
</tr>
</tbody>
</table>

**CONCLUSION (rime structure)**

- Incompatibility of diphthong + consonant with East Asian dual-slot VC rime structures, as evidenced by interlanguage adaptations
- Strategies used to reduce diphthong plus consonant structures:
  - Mandarin: monophthongization (with phonotactic adjustment)
  - Cantonese: monophthongization for mid vowels, consonant deletion for low vowel (greater vowel distance)
  - Vietnamese: consonant deletion

**ISSUE 2: Phonemic status of the alveopalatals**

- Complementary distribution

<table>
<thead>
<tr>
<th>Vowel glide as initial</th>
<th>Alveopalatal</th>
<th>Velar</th>
<th>Retroflex</th>
<th>Alveolar Sibilant</th>
</tr>
</thead>
<tbody>
<tr>
<td>aw</td>
<td>-</td>
<td>k, k’, x</td>
<td>tʂ, tʂʰ, s</td>
<td>tʂ, tʂʰ, s</td>
</tr>
<tr>
<td>i/ɪ</td>
<td>ʨ, ʨʰ, ɕ</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>u/w</td>
<td>-</td>
<td>k, k’, x</td>
<td>tʂ, tʂʰ, s</td>
<td>tʂ, tʂʰ, s</td>
</tr>
<tr>
<td>y/ɥ</td>
<td>ʨ, ʨʰ, ɕ</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

**ISSUE 2: Phonemic status of the alveopalatals**

- The problem of complementary distribution
  - The alveopalatal initials [ʨ, ʨʰ, ɕ] occur exclusively before the vowels [i, y] or their corresponding medial glides, whereas there exist three other sets of Mandarin initials, namely the alveolar sibilants [ʦ], [ʦʰ], [ʂ], the retroflex sibilants [ʈʂ], [ʈʂʰ], [ʂ], and the velars [k], [kʰ], [x], which never appear before [i, y] or their corresponding glides.
  - The complementary distribution of the alveopalatal initials with the alveolar sibilants; the retroflex sibilants, and the velars have prompted many linguists to treat the alveopalatals as allophonic variants of one of the three complementary series, most notably the alveolar sibilants or the velars.
**ISSUE 2: Phonemic status of the alveopalatals**

<table>
<thead>
<tr>
<th>vowel/glide vs initial</th>
<th>alveopalatal</th>
<th>velar</th>
<th>retroflex</th>
<th>alveolar sibilant</th>
</tr>
</thead>
<tbody>
<tr>
<td>zero</td>
<td>-</td>
<td>k, kʰ,x</td>
<td>tʂ, tʂʰ, ʂ</td>
<td>tʂ, tʂʰ, s</td>
</tr>
<tr>
<td>j/l</td>
<td>tɕ, tɕʰ, ɻ ɻ</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>u/w</td>
<td>k, kʰ, x</td>
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<td></td>
</tr>
<tr>
<td>y/u</td>
<td>tɕ, tɕʰ, ɻ ɻ</td>
<td>-</td>
<td>-</td>
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</tbody>
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- **PROPOSALS**
  1. Grouping with velars
  2. Grouping with alveolar sibilants
  3. Grouping with retroflex initials (no proposals to date)
  4. Alveopalatals as independent series (accidental gap)

**OPTION 1: Grouping with velars**

- Chao (1934) was the first to formally argue for treatment of the alveopalatals as allophones of the velar initials, citing native speaker judgement of sound similarity and alveopalatal–velar interchangeability in Mandarin language games (1934: 48).
- Additional evidence ranging from etymological origin and alliterative onomatopoeic expressions to English–Chinese transliteration conventions have been cited to support the alveopalatal–velar affiliation (Fu 1956; R. Cheng 1966; Lin 1989).

**OPTION 2: Grouping with alveolar sibilants**

- Duanmu (2000) uses native speaker intuition to argue for treating the alveopalatals as palatalized allophones of the alveolar sibilants, citing also greater phonetic similarity between the two series.

**OPTION 3: Grouping with retroflex initials (no proposals to date)**

**OPTION 4: Alveopalatals as independent series**

- C.C. Cheng (1973: 38) notes that much of the affiliation of the alveopalatals with the velars and alveolar sibilants is historical rather than synchronic in nature.
- Claims of native speaker judgement and evidence from alliterative onomatopoeic expressions in the literature have been shown to be conflicting (Xu 1994; Li 1999).
- “It remains to be investigated whether the phonemes established on these criteria are in accordance with the phonemes taken to represent perceptual units of the native speaker” (R. Cheng 1966: 142).
OPTION 4: Alveopalatals as independent series

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<td>k, kʰ</td>
<td>tʂ, tʂʰ</td>
<td>ʂ tʂ, ʦ tʂʰ, s</td>
</tr>
<tr>
<td>ɻ/ɻ</td>
<td>tɕ, tɕʰ, s</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>u/w</td>
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</tr>
<tr>
<td>ʃ/ʃ</td>
<td>tɕ, tɕʰ, s</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Which option regarding the phonemic status of the Mandarin alveopalatals?

- Evidence from L1 phonological transfer

OPTION 1: Grouping with velars

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</tr>
<tr>
<td>ʃ/ʃ</td>
<td>tɕ, tɕʰ</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
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- Predictions of alveopalatal–velar grouping:
  - inability to pronounce ENG velar + [i]
  - “give” → [tsɪv]
  - “keep” → [tsʰip] (confuse with “cheap/it”)
  - “hip” → [sɪp] (confuse with “ship/it”)

- Result of prediction:
  - Replacement of English velars with Mandarin alveopalatals not evidenced in literature
  - Confusion of English velars with English palato-alveolars not evidenced in literature
  - Conclusion: alveopalatals are not allophones of the velars

OPTION 2: Grouping with alveolar sibilants

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</tr>
<tr>
<td>ɻ/ɻ</td>
<td>tɕ, tɕʰ</td>
<td>-</td>
<td>-</td>
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<td>ʃ/ʃ</td>
<td>tɕ, tɕʰ</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

- Predictions of alveopalatal–alveolar sibilants grouping:
  - Inability to pronounce ENG alveolar sibilant + [i]
  - “see” → [sɭ] (Yao 2009: 293; Tsai 2011: 31-33)
  - Mandarin only; not Cantonese

- Result of prediction:
  - Replacement of English alveolar sibilants with Mandarin alveopalatals common
  - CONCLUSION:
    - alveopalatals may well be allophones of the alveolar sibilants
OPTION 3: Grouping with retroflex

- Predictions of alveopalatal-retroflex grouping:
  - Inability to pronounce retroflex + [i]
    - No basis for comparison (no retroflex plus [i] sequences in observed L2s), but approximation with ENG palato-alveolars ȴ, ȷ, ȓ yields L1 replacements

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<tr>
<td>i, u, y, w</td>
<td>k, kʰ, x</td>
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<td>tʂ, tʂʰ, s</td>
</tr>
<tr>
<td>e, ə, ɛ</td>
<td>-</td>
<td>tɬ, tɬʰ, ʃ</td>
<td>-</td>
</tr>
</tbody>
</table>

- Approximation with ENG palato-alveolars ȴ, ȷ, ȓ yields L1 replacements

- Northern (mainland) Mandarin
  - “George” as 桌紙 (retroflex replacement plus vowel change)
  - English ȴ, ȷ, ȓ have the same place of articulation (palato-alveolar) as Mandarin tɬ, tɬʰ, ʃ but different tongue configurations (Ladefoged and Maddieson 1996: 148-154)
  - English palato-alveolars are acoustically closer in terms of centroid frequency to Mandarin retroflex initials than to the Mandarin alveopalatal initials (Chang et al. 2011: 28-29)
  - Experiments show that native speakers of Mandarin often were not able to maintain a reliable distinction between Mandarin ɬ and English ȓ (Chang et al. 2011: 30-32)

- Southern (Taiwan) Mandarin
  - “George” as 糾舉 (alveopalatal replacement)
  - The English segments /ȴ, ȷ, ȓ/ have their counterparts in Mandarin /ɬ, ɬȹ, ɮ/. Their phonological similarity induces the participants to establish correspondences between the target sound and their Mandarin counterparts (Chen 1999: iv)
  - Heritage Taiwanese learners (American-born Taiwanese) often pronounce Mandarin ɬ, ɬȹ, ɮ as ȴ, ȷ, ȓ (Young 2007 91-106)

- Conclusion: evidence is inconclusive as to whether alveopalatal segments may be allophones of retroflex initials due to lack of reliable data

OPTION 4: Alveopalatal as independent series

- Predictions of independent alveopalatal series:
  - Predicts no problems with alveolar sibilant plus [i] sequence, e.g., “see”
  - Conclusion: L1 transfer in Chinese ESL learners shows that the Mandarin alveopalatal initials ɬ, ɬȹ, ɮ are most like allophones of the alveolar sibilants tʂ, tʂʰ, s

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<td>i, u, y, w</td>
<td>k, kʰ, x</td>
<td>tɬ, tɬʰ, ʃ</td>
<td>-</td>
<td>tɬ, tɬʰ, s</td>
</tr>
<tr>
<td>e, ə, ɛ</td>
<td>-</td>
<td>-</td>
<td>tɬ, tɬʰ, ʃ</td>
<td>-</td>
</tr>
</tbody>
</table>

- Types of evidence traditionally used to determine Mandarin phonological structure
  - Language games (e.g., pig Latin - artificial convention that has to be learned)
  - Poetic devices (e.g., rhyming - artificial convention that has to be learned)
  - Slips of the tongue (inconclusive)
  - Allusion and onomatopoeic expressions (historical residue)
  - Native speaker judgement (he says, she says)

- Usefulness of interlanguage data (involuntary)
- Varieties of Mandarin (e.g., north vs south) heterogeneous structures

DISCUSSION