Trisyllabic Tone Sandhi in Tianjin Mandarin

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Mandarin speaking

Non-Mandarin speaking

Data from http://en.wikipedia.org/wiki/Mandarin_Chinese
Tianjin: A Different Tonal System

- Different lexical tonal contours
- More tone sandhi rules
- Complicated Tone Sandhi Application

Hot Issues of Tianjin Tone Sandhi
- The exact number of bisyllabic sandhi rules
- The application of bisyllabic sandhi patterns in trisyllabic sequences

(e.g., Zhang & Liu, 2011; Huang et al., 2005; Ma, 2005; Chen, 2000; Tan, 1987; Hung, 1987; Zhang, 1987; Li & Liu, 1985)
# Lexical Tones (in isolation)

<table>
<thead>
<tr>
<th></th>
<th>Tone 1</th>
<th>Tone 2</th>
<th>Tone 3</th>
<th>Tone 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>High level</td>
<td>Rising</td>
<td>Dipping</td>
<td>Falling</td>
</tr>
<tr>
<td>Tianjin</td>
<td>Low falling</td>
<td>High rising</td>
<td>Dipping</td>
<td>High falling</td>
</tr>
</tbody>
</table>

Lower register

Higher register
Tone Sandhi in Literature

- **Four Claimed Bisyllabic Patterns**
  - \( \text{T1+T1} \rightarrow \text{T3+T1} \)
  - \( \text{T3+T3} \rightarrow \text{T2+T3} \)
  - \( \text{T4+T4} \rightarrow \text{T1+T4} \)
  - \( \text{T4+T1} \rightarrow \text{T2+T1} \)

- **27 Claimed Trisyllabic Patterns**
  - **20 simple application cases**
    - e.g., \( \text{T2+T1+T1} \rightarrow \text{T2+T3+T1} \)
  - **7 complex application cases**
    - e.g., Iterative Application: \( \text{T3+T1+T1} \rightarrow \text{T3+T3+T1} \rightarrow \text{T2+T3+T1} \)
    - Directionality: \( \text{T1+T1+T1} \)

(e.g., Zhang & Liu, 2011; Ma, 2005; Chen, 2000; Tan, 1987; Hung, 1987; Zhang, 1987; Li & Liu, 1985; but see Huang et al., 2005 for more proposals of tone sandhi)
Research Questions

- What are the bisyllabic tone sandhi patterns in Tianjin?
- How are the bisyllabic tone sandhi patterns applied in trisyllabic sequences?
Method

Materials
16 Bisyllabic + 64 Trisyllabic tonal combinations in Tianjin Mandarin

Subjects
6 speakers (3 male + 3 female); in 20s

Recording

QUESTION: \text{Nar}^3 \text{shi}^4 \text{yi}^2 \text{kuai}^4 \text{bu}^4 \text{mao}^2 \text{zhi}^1 \text{di}^4? \text{哪儿是一块不毛之地？}

\text{“Where is a barren land?”}

ANSWER: \text{Sa}^1 \text{ha}^1 \text{la}^1 \text{shi}^4 \text{yi}^2 \text{kuai}^4 \text{bu}^4 \text{mao}^2 \text{zhi}^1 \text{di}^4. \text{撒哈拉是一块不毛之地。}

\text{“Sahara is a barren land.”}
**Bisyllabic Tone Sandhi – Not the change of one lexical tone to another**

- **T1+T1 → T3+T1**
  - T1
  - T3
  - T1
  - (with +/- 1 standard error of mean)

- **T3+T3 → T2+T3**
  - T3
  - T2
  - T3
  - (with +/- 1 standard error of mean)

- **T4+T4 → T1+T4**
  - T4
  - High falling – T4
  - Low falling – T1
  - (with +/- 1 standard error of mean)

- **T4+T1 → T2+T1**
  - T4
  - T2
  - T1
  - (with +/- 1 standard error of mean)
Summary of Bisyllabic Tone Sandhi

Tone sandhi in Tianjin:

Not the change of one lexical tone to another

- $T_3+T_3 \rightarrow T_2+T_3$ – Almost neutralized with subtle differences
- $T_1+T_1 \rightarrow T_3+T_1$ – Not neutralized
- $T_4+T_1 \rightarrow T_2+T_1$ – Not neutralized
- $T_4+T_4 \rightarrow T_1+T_4$ – No sandhi change
Simple Tone Sandhi Application in Trisyllabic Sequences

- **Literature**
  - Apply consistently
    
    e.g. $T_1+T_1+Tx$  
    $Tx+T_1+T_1$

(Huang et al., 2005; Ma, 2005; Chen, 2000; Tan, 1987; Hung, 1987; Zhang, 1987; Li & Liu, 1985)

- **Our findings**
  - Only $T_3+T_3$ applies consistently
  - $T_1+T_1$ and $T_4+T_1$ right aligned
T3+T3 → T2+T3: Consistently applied

(with +/- 1 standard error of mean)
T1+T1 → T3+T1: Right aligned

(with +/- 1 standard error of mean)
$T_4+T_1 \rightarrow T_2+T_1$: Right aligned

$T_4+T_1+T_1$  $T_4+T_1+T_2$  $T_4+T_1+T_3$  $T_4+T_1+T_4$

$T_1+T_4+T_1$  $T_2+T_4+T_1$  $T_3+T_4+T_1$  $T_4+T_4+T_1$

(with +/- 1 standard error of mean)
Summary of Simple Sandhi Application in Trisyllabic Sequences

- $T3+T3 \rightarrow T2+T3$ – Consistently applied
- $T1+T1 \rightarrow T3+T1$ – Right aligned
- $T4+T1 \rightarrow T2+T1$ – Right aligned
Complex Sandhi Application

1. T3+T3+T3
2. T4+T4+T1  Simple Application: T4+\textbf{T4+T1}
3. T4+T4+T4  Sandhi over T1+T1 and T4+T1 are only right aligned
4. T3+T1+T1  No Tone Sandhi over T4+T4
5. T1+T4+T4
6. T1+T1+T1  Simple Application: T1+\textbf{T1+T1}
7. T4+T1+T1  Simple Application: T4+\textbf{T1+T1}

(e.g., Huang et al., 2005; Ma, 2005; Chen, 2000; Tan, 1987; Hung, 1987; Zhang, 1987; Li & Liu, 1985)
Two remaining cases (1): T3+T1+T1

- Literature
  T3+T1+T1 → T3+T3+T1 → T2+T3+T1

- Our finding

  T3+T1+T1 vs T2+T3+T1 (with +/- 1 standard error of mean)
Two remaining cases (2): T3+T3+T3

Left to Right

\[ T3+T3+T3 \rightarrow T2+T3+T3 \rightarrow T2+T2+T3 \]

Right to Left

\[ T3+T3+T3 \rightarrow T3+T2+T3 \]

(with +/- 1 standard error of mean)
Concluding Remarks
- a much simpler picture of Tianjin tone sandhi

- Tone Sandhi: Not the change of one lexical tone to another

- Only **Three** Bisyllabic Sandhi Patterns
  - T3+T3, T1+T1, T4+T1

  - Not all applied consistently in trisyllabic sequences
    - T3+T3 is consistently applied
    - T1+T1 and T4+T1 are right aligned

- Complex trisyllabic sandhi is only found in T3+T3+T3
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Selected References


etc.
Thank you for your attention!

Questions and comments are welcome!

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