

# MANDARIN TONE 3

## The How's and the Why's

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# MANDARIN TONE 3: uniqueness

- Systemic differences
  - Half vs full third (半三聲 vs 全三聲)
  - Tone 3 sandhi (三聲連讀變調)

# MANDARIN TONE 3: uniqueness

- Half vs full third (半三聲 vs 全三聲)
  - TRADITIONAL DESCRIPTION:
    - In everyday conversation, the third tone, unless emphasized, is seldom pronounced fully. It is often truncated into a half-third tone, which stays in the low pitch without much attempt to rise up again. [Wang, Chi, and Feng (2007). *Chinese Odyssey: Innovative Chinese Courseware*. Boston: Cheng & Tsui]
  - (No explanation as to why)



# MANDARIN TONE 3: uniqueness

- Tone 3 sandhi (三聲連讀變調)
  - Traditional explanation
    - It is **very difficult to say** two third tones one after the other without interrupting the flow of one's speech. For this reason, the first of them changes to second tone. [T'ung and Pollard (1982). *Colloquial Chinese*, p.3. London: Routledge]
  - Problems
    - "**Very difficult to say**" is a catch-all explanation (萬用解釋) that has no predictive power
    - Consecutive low-dipping tones are not "**very difficult to say**" in other dialects (e.g., Xi'an; S. Min; Cantonese)




# MANDARIN TONE 3: uniqueness

- Left unexplained (Tone 3 sandhi)
  - What if there are **more than two third tones syllables** in a sequence?
  - What do textbooks say?
    - MAJORITY: No explanation
    - SOME: Partial explanation; faulty explanation



Tone sandhi:  
Why do tones change in Chinese?  
#AskNincha  
Ninchanese

# MANDARIN TONE 3: uniqueness

- More than 2 third tone syllables
  - Partial/faulty description:
    - When three third tones follow one another and they are in one meaning group, **the second one changes to the second tone** whilst **the other two remain in the third tone** [Qian, Yan (1995) *Colloquial Chinese*, p.7. London: Routledge].
  - 3-3-3 → 3-2-3
  - Is that really true?
    - 老鼠屎
    - 展覽館
    - 總統府



## MANDARIN TONE 3: uniqueness

- More than 2 third tone syllables

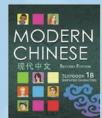
- Partial/faulty description:

- When three third tones are said together in the same breath, **the first two change to second** [T'ung and Pollard (1982). *Colloquial Chinese*, p.3. London: Routledge].
- When a group of two or more third tone syllables appear consecutively in a single phrase, **all of the third tones but the final one are changed to the second tone** [Shen & Lin (2013) *Modern Chinese, Textbook 1A*, Sunnyvale, CA: Better Chinese].

- 3-3-3 → 2-2-3

- Is that really true?

- 米老鼠
- 李總統
- 洗冷水澡



## EXPLANATIONS

- Explanations exist in the literature

- Accounts from all theoretical persuasions, but not generally accessible

- Metrical phonology 節律音位學
- Optimality theory 優選理論
- Historical linguistics 歷史語言學
- Sociolinguistics 社會語言學
- Child language acquisition 兒童語言習得

- But are **complex** due to other considerations:

- Stress 輕重音
- Pauses 停頓
- Speech rate 說話速度
- Pan-dialectal considerations 方言現象

## PURPOSE

(VIA AUTOSEGMENTAL METRICAL THEORY 自主音段節律理論)

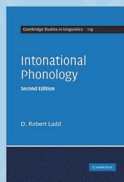
- Provide a LITE VERSION

- Prioritize SIMPLICITY over BREADTH (只求簡潔不求完備性)

- **SIMPLICITY** (簡潔性): simplest possible model
- **LESS BREADTH** (完備性): no consideration of stress, speed, pauses etc

- Distillation of theoretical explanation (**barebones version** to satisfy non-expert curiosity):

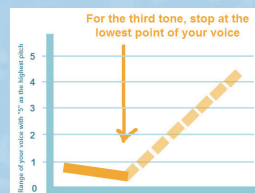
- **HOW** Tone 3 behaves
- **WHY** Tone 3 behaves that way



## WHY?

- **Half vs full third** (半三聲 vs 全三聲)

- Tone 3 **sandhi** (三聲連讀變調)



## Tonal universals 聲調通則

- Cahill, Mike. 2008. "More Universals of Tone". *SIL Working Papers* 2007-007.

1. floating tones migrate rightward
2. words with **all-Low tones** are dispreferred
3. a **HLH phonetic sequence** is dispreferred

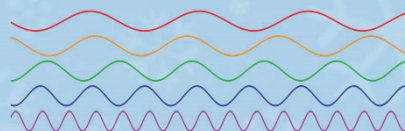
- Half vs full third
- (半三聲 vs 全三聲)

- Tone 3 **sandhi**
- (三聲連讀變調)

## WHY? Digging a little deeper

- Fundamental concepts

1. 標示 REPRESENTATION (modeling of tone)
2. 限制 CONSTRAINTS
  1. 調形限制 TONEMES PER SYLLABLE (TBU)
  2. 異化作用 DISSIMILATION (必異原理 obligatory contour principle)



## (1) 標示方法 representation



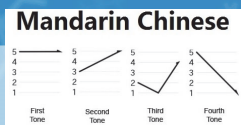
## (1) 標示方法 representation

- 調名 Philological labels
- 調號 Modern labels
- (NOTE: labels only; no clue as to properties or behavior)

|                     | ①      | ②      | ③      | ④      |
|---------------------|--------|--------|--------|--------|
| Philological labels | 陰平     | 陽平     | 上      | 去      |
| Modern labels       | Tone 1 | Tone 2 | Tone 3 | Tone 4 |



## (1) 標示方法 representation



- 調值 Tone numerals (五度標記法)
- 調符 Tone letters (Chao, Yuen-Ren (1930), "à sistim av 'toun-letəz'" [A system of "tone-letters"], *Le Maître Phonétique*, 30: 24-27)

|                  | ①  | ②  | ③   | ④  |
|------------------|----|----|-----|----|
| 調值 Tone numerals | 55 | 35 | 214 | 51 |
| 調符 Tone letters  | 1  | 4  | ˩   | ˥  |
| 聲調標示 Diacritics  | ā  | á  | ǎ   | à  |

- NOTE: physical mapping only (details surface properties, but not useful for predicting behavior—e.g., # of possible tones)

## (1) 標示方法 representation

- 自主音段標記法 Autosegmental representation ♡:
  - PITCH LEVELS: L, (M), H
  - CONTOURS: rising (LH), falling (HL), dipping (MLH)
- Proven capable of **predicting** tonal behavior in the languages of the world (e.g., # of tones, interactions)



## (1) 標示方法 representation

- 自主音段標記法
  - Mandarin citation tones in autosegmental representation:

|         | ① | ②  | ③   | ④  |
|---------|---|----|-----|----|
| Contour | H | LH | MLH | HL |

## (2) 限制 CONSTRAINTS

1. 調形限制 TONEMES PER SYLLABLE (TBU)
2. 異化作用 DISSIMILATION (必異原理 obligatory contour principle)

|         | ① | ②  | ③   | ④  |
|---------|---|----|-----|----|
| Contour | H | LH | MLH | HL |

|         | ① | ②  | ③   | ④  |
|---------|---|----|-----|----|
| Contour | H | LH | MLH | HL |

- **Contour limitations**
  - **Two (2) tonemes** per syllable (葉梅娜 Yip 1980 *Tonal Phonology of Chinese*, p.283)
  - c.f. Hungarian (Ladd 2008 *Intonational Phonology*, p.182)
  - Except for right edge (right edge of intermediate/phonological phrase)

## Tonemes per syllable

|         | ① | ②  | ③   | ④  |
|---------|---|----|-----|----|
| Contour | H | LH | MLH | HL |

- **Application to Mandarin Tone 3**
  - **2-TONE LIMIT:** Maximum two (2) tonemes per syllable (TBU)
  - **RIGHT EDGE EXCEPTION:** Dipping contour MLH possible only at right edge (end of utterance)
  - **TONE TRUNCATION:** Must be truncated to two tonemes in mid-sentence positions

## Tonemes per syllable

- **HOW TO TRUNCATE** (mid-utterance):
  - **DEFAULT:** delete final pitch level
    - **MLH** (full third) → **ML** (half third)
    - **UNIVERSAL:** preserve **head (nuclear) tone(s)** (葉梅娜 Moira Yip 2002: 176)
    - Explains emergence of **half-third** 半三聲 in mid-utterance positions
  - **EXCEPTION:** two consecutive T3 syllables
    - **MLH + MLH** → **ML + ML**
    - **UNIVERSAL:** all low words are dispreferred (Cahill 2008)
    - Output of two adjacent identical contours is a violation of the **Obligatory Contour Principle** (OCP 必異原理)

## 異化作用 DISSIMILATION

- **必異原理 obligatory contour principle (OCP)**

## WHY? (3) dissimilation

- The **obligatory contour principle** (OCP 必異原理):
  - **DEFINITION:** adjacent identical elements are avoided (i.e., avoid having two instances of the same element right next to each other; c.f., 撞衫)
  - OCP as a **soft constraint** (vs **hard constraint**)
  - Avoidance of adjacent identical elements only when an **alternative option** presents itself
  - In adjacent Mandarin T3 syllables, there are alternative **methods of truncation**

## WHY? (2) pitch levels per syllable

- **HOW TO TRUNCATE** (mid-utterance):
  - **DEFAULT:** delete final pitch level
    - **MLH** (full third) → **ML** (half third)
    - Explains emergence of **half-third** 半三聲 in mid-utterance positions
  - **EXCEPTION:** two consecutive T3 syllables
    - **MLH + MLH** → **LH + ML**
    - Delete the initial tone (**M**) in the 1st syllable, but delete the final tone (**H**) in the 2nd syllable
    - Avoids producing 2 adjacent identical contours, thus conforms with **Obligatory Contour Principle** (OCP 必異原理)



## WHY tone sandhi and truncation?

### • RECAP

- Why **half vs full** third? (半三聲 vs 全三聲)
  - **TRUNCATION**: only 2 tonemes allowed per syllable (mid-utterance)
- Why **Tone 3 sandhi**? 三聲連讀變調
  - Management of **TRUNCATION OPTIONS** (head or tail) to avoid OCP violation
    - NOTE: OCP violations tolerated for **other tonal sequences** (e.g., T1, T2) because truncation options not present
    - NOTE: Consecutive low tones allowed in **other dialects** [e.g., Xi'an, S. Min, Cantonese] because their low tones did not come from truncation)

## OPTIMALITY TABLEAU: Single Tone 3: Utterance-final

|     | NO TROUGH | MAX-HEAD | MAX-NON-HEAD |
|-----|-----------|----------|--------------|
| MLH |           |          |              |
| LH  |           | *!       |              |
| ML  |           |          | *!           |

### • CONSTRAINTS:

- No TROUGH 句中避凹調: avoid dipping contours mid-utterance
- MAX-HEAD 勿砍頭: do not delete leftmost pitch level
- MAX-NON-HEAD 勿砍尾: do not delete rightmost pitch level

## OPTIMALITY TABLEAU : Single Tone 3: Mid-utterance

|     | NO TROUGH | MAX-HEAD | MAX-NON-HEAD |
|-----|-----------|----------|--------------|
| MLH | *!        |          |              |
| LH  |           | *!       |              |
| ML  |           |          | *            |

### • CONSTRAINTS:

- No TROUGH 句中避凹調: avoid dipping contours mid-utterance
- MAX-HEAD 勿砍頭: do not delete leftmost pitch level
- MAX-NON-HEAD 勿砍尾: do not delete rightmost pitch level

## OPTIMALITY TABLEAU : Consecutive Tone 3

|         | OCP | MAX-H1 | MAX-H2 | MAX-NH1 | MAX-NH2 |
|---------|-----|--------|--------|---------|---------|
| ML + ML | *!  |        |        |         |         |
| LH + LH | *!  |        |        |         |         |
| ML + LH |     | *!     |        |         | *       |
| LH + ML |     |        | *      | *       |         |

### • CONSTRAINTS:

- OCP 必異原理: avoid identical adjacent contours
- MAX-H1 勿砍首音節頭: do not delete leftmost pitch level of first syllable
- MAX-H2 勿砍次音節頭: do not delete leftmost pitch level of second syllable
- MAX-NH1 勿砍首音節尾: do not delete rightmost pitch level of first syllable
- MAX-NH2 勿砍次音節尾: do not delete rightmost pitch level of second syllable

## How?

- More than two Tone 3 syllables in a sequence



## How: More than 2 third tones

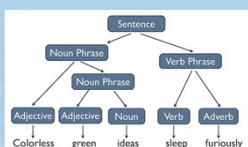
- An ACCURATE though INCOMPLETE description:

- When three or more third-tone syllables are strung together, the third-tone sandhi rule **can** telescope upon itself and change all but the final syllable to second tone.
- But this is not always the case.
- Depending on the **phrase structure** of the string of syllables, or upon whether the speaker chooses to pause, the "telescoping" of tone sandhi may or may not occur. [Chen, Link, Tai, and Tang (1994). *Chinese Primer: Lessons*. Princeton: Princeton University Press.]



## How: More than 2 third tones

- “Depending on the PHRASE STRUCTURE” (ignoring speed/pauses)
  - Sensitivity to **hierarchical structure** (morpho-syntactic)
  - Application from **innermost layer**
- C.C.Cheng's 鄭錦全 simultaneous application model
  - the surface structure with its bracketing provides appropriate domains for application of phonological rules... (Mandarin Phonology, 1968, p.113)
  - a “tree-only approach” (Duanmu 2000: 240): a syntactic (vs prosodic) account



## How: More than 2 third tones

### 3-syllable examples



- C.f.
- 母(老虎)
  - 老(總統)
  - 買(米酒)



- C.f.
- (展覽)館
  - (輔導)長
  - (總統)府

## How: More than 2 third tones

### 4-syllable examples



- C.f.
- 咬[母(老虎)]
  - 很[想(洗澡)]
  - 想[選(總統)]



- C.f.
- 買[(草稿)紙]
  - 踩[(老鼠)屎]
  - 洗[(米酒)水]



- C.f.
- [(展覽)館]長
  - [(米酒)桶]裡
  - [(洗澡)水]裡

## How: More than 2 third tones



Same characters / different sandhi pattern - due to different hierarchical phrase structure

### - [買<sub>3</sub>(好<sub>2</sub>酒<sub>3</sub>)]

- Buy good wine
- 你買的酒是好酒還是壞酒?

### - [(買<sub>2</sub>好<sub>2</sub>)酒<sub>3</sub>]

- Finished buying wine
- 酒買好了沒有?



## How: More than 2 third tones

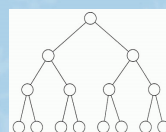
### Longer examples

- 我<sub>N</sub>(想<sub>Aux</sub>[請<sub>V</sub>{(李<sub>3</sub>(總<sub>2</sub>統<sub>2</sub>))<sub>NP</sub>][洗<sub>V</sub>{(冷<sub>2</sub>水<sub>2</sub>)<sub>NP</sub>][澡<sub>VP</sub>]])
- 我<sub>3</sub>(想<sub>3</sub>[請<sub>3</sub>{(李<sub>3</sub>(總<sub>3</sub>統<sub>3</sub>))<sub>NP</sub>][洗<sub>3</sub>{(冷<sub>3</sub>水<sub>3</sub>)<sub>NP</sub>][澡<sub>3</sub>]])
- 我<sub>3</sub>(想<sub>3</sub>[請<sub>3</sub>{(李<sub>3</sub>(總<sub>2</sub>統<sub>3</sub>))<sub>NP</sub>][洗<sub>3</sub>{(冷<sub>2</sub>水<sub>3</sub>)<sub>NP</sub>][澡<sub>3</sub>]])
- 我<sub>3</sub>(想<sub>3</sub>[請<sub>3</sub>{(李<sub>3</sub>(總<sub>2</sub>統<sub>2</sub>))<sub>NP</sub>][洗<sub>3</sub>{(冷<sub>2</sub>水<sub>2</sub>)<sub>NP</sub>][澡<sub>3</sub>]])
- 我<sub>3</sub>(想<sub>3</sub>[請<sub>3</sub>{(李<sub>3</sub>(總<sub>2</sub>統<sub>2</sub>))<sub>NP</sub>][洗<sub>3</sub>{(冷<sub>2</sub>水<sub>2</sub>)<sub>NP</sub>][澡<sub>3</sub>]])
- 我<sub>2</sub>(想<sub>3</sub>[請<sub>2</sub>{(李<sub>3</sub>(總<sub>2</sub>統<sub>2</sub>))<sub>NP</sub>][洗<sub>3</sub>{(冷<sub>2</sub>水<sub>2</sub>)<sub>NP</sub>][澡<sub>3</sub>]])

## CONCLUSION



- WHY Tone 3 Sandhi / half vs third T3?
  - Truncation to limit **tonemes per syllable**
  - Management of truncation options to **observe OCP**
- HOW does Tone 3 Sandhi apply?
  - Sensitivity to **hierarchical structure**
  - Application from **innermost structure**



## Thank you

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