# Morphologically conditioned tone changes in Cantonese are grammatical tones

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## INTRODUCTION

- *pinjam* 變音 "changing tones": morphologically conditioned tone changes (Matthews & Yip, 2013)
- Mark inflectional & derivational morphology (Alderete et al., 2022; Yu, 2007)
- I argue they should be analyzed as **grammatical tones (GT)**
- GTs are present not only in African & American tone languages (e.g., Rolle, 2018) , but in East Asian languages as well!

## TYPES OF GRAMMATICAL TONES

- All GTs target stems with non-H tones (tone 3-6)
- Non-H tones all alternate to high rising tone (tone 2)
- GTs are blocked in H-toned stems (tone 1-2)

| | | |
|---|---|---|
| 1. High level | H | 詩 |
| 2. High rising | MH | 史 |
| 3. Mid level | M | 試 |
| 4. Low falling | ML | 時 |
| 5. Low rising | LM | 市 |
| 6. Low level | L | 是 |

Table 1: Autosegmental representations of Cantonese lexical tones (from Chen 2000)

1. **Functional morphemes in [V-func] sequences** (optional)
   - Perfective aspect (Yu, 2007)
     pɔŋ$^{L}$-tsɔ$^{MH}$ → pɔŋ$^{MH}$ 'weigh' (PERF)
   - Potential mood (Yu, 2007)
     kin$^{M}$-tɐk$^{H}$ → kin$^{MH}$ 'meet' (POTENTIAL)
   - Diminutive
   - si$^{M}$ 'try' → si$^{M}$-jɐt$^{H}$-si$^{M}$ 'try for a bit' → si$^{MH}$-si$^{M}$
   - Other [V func] constructions
     lɐu$^{ML}$ 'leave' + hɐi$^{MH}$ 'at' → lɐu$^{MH}$ 'leave at'
2. **Tonal suffixes with floating H tone** (compulsory)
   - Verb nominalization (Yu, 2007)
     sou$^{M}$ 'sweep (v)' → sou$^{MH}$ 'broom (n)'
   - Semantic narrowing (Alderete et al., 2022)
     nøy$^{LM}$ 'female' → nøy$^{MH}$ 'daughter'
   - Vocative (Alderete et al., 2022)
     a$^{M}$ (VOC) + tsɛ$^{L}$ (proper name) → a$^{M}$-tsɛ$^{MH}$
   - Compound (Alderete et al., 2022)
     maŋ$^{ML}$ 'blind' + tsʰœŋ$^{ML}$ 'intestine' → maŋ$^{ML}$tsʰœŋ$^{MH}$ 'appendix'
   - Diminutive (Matthews & Yip 2013)
     fei$^{ML}$ 'fat' → fei$^{ML}$-fei$^{MH}$-tei$^{MH}$ 'a bit fat'

## OT ANALYSIS

Constraints:

a. *ComplexContour: Assign a violation to every TBU that is associated with more than two tones
b. *LH: Assign a violation for each sequence of LH within a TBU
c. *Associate(M): Assign a violation to every new association between a M tone and a TBU that is not present the input (modified from Yip, 2002)
d. RealizeMorpheme: Assign a violation to every morpheme which tone is not preserved in the output (van Oostendorp, 2005)
e. Max(Seg): Assign a violation to every segment that is deleted in the output
f. FuncReduce: Assign a violation for each functional morpheme that is not reduced (Alderete et al., 2022)

Careful speech: *ComplexContour, *LH, *Assoc(L), RealizeMorpheme >> **Max(Seg) >> FuncReduce**

Rapid speech: *ComplexContour, *LH, *Assoc(L), RealizeMorpheme >> **FuncReduce >> Max(Seg)**

(1) L tone verb root with MH tone suffix

| /pɔŋ$^{L}$-tsɔ$^{MH}$/ | *Complex Contour | *LH | *Assoc(L) | Realize Morpheme | Max(Seg) | Func Reduce |
|---|---|---|---|---|---|---|
| a. ☞ pɔŋ$^{L}$-tsɔ$^{MH}$ | | | | | | * |
| b. ☞ pɔŋ$^{MH}$ | | | | | * | |
| c. pɔŋ$^{L}$ | | | | *! | * | |
| d. pɔŋ$^{LMH}$ | *! | | *! | | * | |
| e. pɔŋ$^{LH}$ | | *! | | | * | |
| f. pɔŋ$^{LM}$ | | | *! | | * | |

(2) L tone verb root with H tone suffix

| /pɔŋ$^{L}$-tɐk$^{H}$/ | *Complex Contour | *LH | *Assoc(L) | Realize Morpheme | Max(Seg) | Func Reduce |
|---|---|---|---|---|---|---|
| a. ☞ pɔŋ$^{L}$-tɐk$^{H}$ | | | | | | * |
| b. pɔŋ$^{H}$ | | | | *! | * | |
| c. pɔŋ$^{L}$ | | | | *! | * | |
| d. pɔŋ$^{LH}$ | | *! | | | * | |
| e. ☞ pɔŋ$^{MH}$ | | | | | * | |

(3) L tone verb root with ML tone suffix

| /pɔŋ$^{L}$-jyn$^{ML}$/ | *Complex Contour | *LH | *Assoc(L) | Realize Morpheme | Max(Seg) | Func Reduce |
|---|---|---|---|---|---|---|
| a. ☞ pɔŋ$^{L}$-jyn$^{ML}$ | | | | | | * |
| b. pɔŋ$^{ML}$ | | | *! | *! | * | |
| c. pɔŋ$^{L}$ | | | | *! | * | |
| d. pɔŋ$^{LML}$ | *! | | *! | | * | |
| e. pɔŋ$^{LM}$ | | | *! | | * | |

(4) ML tone noun root with H floating tone

| /a$^{M}$-wɔŋ$^{ML-(H)}$/ | *Complex Contour | *LH | *Assoc(L) | Realize Morpheme | Max(Seg) | Func Reduce |
|---|---|---|---|---|---|---|
| a. a$^{M}$-wɔŋ$^{ML}$ | | | | *! | | |
| b. a$^{M}$-wɔŋ$^{H}$ | | | | *! | | |
| c. ☞ a$^{M}$-wɔŋ$^{MH}$ | | | | | | |
| d. a$^{M}$-wɔŋ$^{MLH}$ | *! | | | | | |
| e. a$^{M}$-wɔŋ$^{LH}$ | | *! | | | | |

## CONCLUSION

Two types of GTs identified, differ in underlying representation:

1. Functional morphemes in [V func] sequences: GTs are underlyingly associated with [func]. In rapid speech, H tone from [func] docks to the preceding verb root along with segmental deletion
2. Tonal suffixes with floating H tone: Floating H is the underlying representation, docks to the preceding lexical morpheme in the output

- Only H tones can be dissociated from their TBU in the input, so GTs are always H but never M or L
- My OT analysis illustrates why all GTs in Cantonese involve the tonal alternation of lexical morphemes from non-H tone to MH tone

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