

On the Status of Tone in Compensatory Lengthening

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1. Preamble - Dialects of the group Yue (Cantonese, Bobai, Xinyi, etc.)
 - ✓ Compared with Mandarin Chinese where occlusive codas disappeared during historical evolution, the dialects of the group Yue conserve well occlusive codas;
 - ✓ The tonal system of Middle Chinese is well conserved in Yue, whereas there are only four lexical tones in Mandarin, due to the contact with non tonal languages such as Mongol and Manchu.
 - ✓ There are six lexical tones in open syllable in Cantonese, 33, 22, 35, 23, 53 (55), and 21 ; three entering tones are observed in closed syllables, 5, 3, 2.

2. Phenomenon

- ✓ Yue dialects have a process whereby a rising tone replaces the lexical tone of the head noun to derive, among others, diminutive forms, referred to as *Pinjam* (changed tones) in the literature.

(1) Derivation of diminutives (Yu 2007, Chen 2000)

| | | | |
|----------------------|-------------|----------------------------|--------------|
| t ^h oi21 | “terrace” | t ^h oi35 | “table” |
| k ^{wh} ɛn21 | “skirt” | wɛi21 k ^{wh} ɛn35 | “apron” |
| kɛŋ33 | “mirror” | ŋan23 kɛŋ35 | “eyeglasses” |
| t ^h ɔŋ21 | “sugar” | t ^h ɔŋ35 | “candy” |
| nøɣ23 | “female” | nøɣ35 | “girl” |
| ap3 | “duck” | ~ ap35 | |
| kɔt2 tsɔt2 | “cockroach” | ~ kɔt2 tsɔt 35 | |
| kɔp3 | “pigeon” | ~ kɔp35 | |

(2) Verb nominalization

| | | | |
|------------|------------|-------------|-----------|
| Level tone | | Rising tone | |
| sou33 | “to sweep” | sou35 | “a broom” |
| pɔŋ22 | “to weigh” | pɔŋ35 | “a scale” |

| | | | |
|-------|-------------|-------|----------------|
| wa22 | “to listen” | wa35 | “an utterance” |
| tan22 | “to plunk” | tan35 | “a missile” |

(3) Omission of perfective marker and potential marker

| | | | | |
|----|--------------|---|--------|------------------------------|
| a. | pɔŋ22 tsɔ35 | → | pɔŋ35 | “to weigh (PERFECTIVE)” |
| | fa:n22 tsɔ35 | → | fa:n35 | “to transgress (PERFECTIVE)” |
| | ki:n33 tsɔ35 | → | ki:n35 | “to meet (PERFECTIVE)” |
| b. | pɔŋ22 tɛk5 | → | pɔŋ35 | “to weigh (POTENTIAL)” |
| | fa:n22 tɛk5 | → | fa:n35 | “to transgress (POTENTIAL)” |
| | ki:n33 tɛk5 | → | ki:n35 | “to meet (POTENTIAL)” |

2.1 Traditional representations of rising contour derived from *Pinjam*

- ✓ Yip (1980) et Chen (2000)

| | | | | | |
|-----|-----|------------|--|-----|-----------|
| (5) | sou | “to sweep” | | sou | “a broom” |
| | | | | | |
| | M | H | | M | H |

(6) pɔŋ22 tsɔ35 ⇒ pɔŋ35 “to weigh (PERFECTIVE)”

| | | | | | | |
|----|-----|---------|----|-----|----|-----|
| a. | pɔŋ | < tsɔ > | b. | pɔŋ | c. | pɔŋ |
| | | ‡ | | | | |
| | L | LH | | L | LH | LH |

(7) pɔŋ22 tɛk5 → pɔŋ35 “to weigh (POTENTIAL)”

| | | | | | | |
|----|-----|-------|----|-----|----|-----|
| a. | pɔŋ | <tɛk> | b. | pɔŋ | c. | pɔŋ |
| | | ‡ | | | | |
| | L | H | | L | H | M H |

⇒ register readjustment

- ✓ Problems :

- a. Previous phonological treatments posit a floating high tone attaching to the end of the relevant syllable, creating a new 35 tone. However, when the

perfective marker has already a rising contour tone, this hypothetical high floating tone disappears from the representation. If the *Pinjam* always carries the same rising contour tone, why to explain it with two different conjectures?

- b. The above account predicts that the derived rising tone has the same duration as the lexical rising tone. However, Chao (1947) and Benedict (1942) noticed that, in Cantonese, the derived rising tone has a slightly longer duration than the lexical rising tone.
- c. The same phenomenon is observed in Bobai and Xinyi, where the derived rising tones are longer than the lexical rising tone (Wang 1932, Yu & Shen 1987).

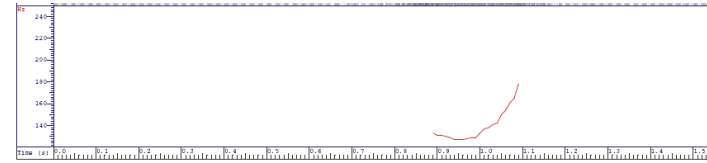


Figure 1 : [fu 35] "bitter"

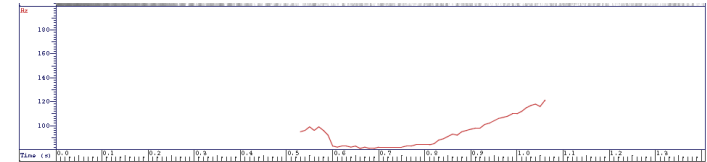


Figure 2 : [tʰɔŋ 35] "candy"

2.2 Phonetic experiment:

- ✓ A Cantonese native speaker of 78 years old, born in the province of Guangdong participated in the study here. He read the word list, each word with five repetitions.

(8)

| | Mean duration of lexical rising tone | | Mean duration of derived rising tone |
|-------------------------|--------------------------------------|--------------------|--------------------------------------|
| sister [ze] | 0.29 | girl [nøɿ] | 0.51 |
| bitter [fu] | 0.21 | candy [tʰɔŋ] | 0.54 |
| to write [se] | 0.25 | apron [wəi kʷhən] | 0.4 |
| to speak [koŋ] | 0.29 | call girl[mu nøɿ] | 0.6 |
| cause [saj] | 0.24 | table [tʰoi] | 0.54 |
| Mean duration | 0.256 | Mean duration | 0.518 |
| Standard deviation | 0.03 | Standard deviation | 0.08 |
| Ratio lexical : derived | 1 : 2.02 | | |

- ✓ Even the longest lexical rising tone averages shorter in duration than the shortest derived rising tone.

2.3 Establishing a correspondence between the Mandarin diminutive suffix [-t] and the Cantonese high rising *Pinjam*, Chao used *mora* to describe this additional length, suggesting that the Cantonese suffix is a mora taking the form of a high tone rather than sound segments.

⇒ This conjecture, capable of explaining the additional length associated with the *Pinjam*, is contrary to current theories according to which tones, being suprasegmental objects, have no temporal basis of their own. How to solve this paradox?

2.4 The case in Daye (Mandarin dialect)

- ✓ Five lexical tones are observed in this dialect, i.e. 33, 31, 53, 35 and 13.
- ✓ Just as in Cantonese, the diminutive morpheme is purely tonal in Daye (Wang 1996). Wang (1996) calls it “emotive tone”, whose function is similar to that of *Pinjam* in Cantonese.
- ✓ The diminutive morpheme is realized on the stem by a high falling contour tone that Wang transcribes as 553. When the head noun carries the lexical tone 31, the

tonal morpheme 553 does not attach to the stem, and it is necessary to add the morpheme [sai 35] “little” before the noun. In this case, this morpheme also becomes 553, as is shown in (9b) :

- (9) a. tɔ 33 “knife” → tɔ 553 “little knife”
 tso 13 “table” → tso 553 “little table”
 tɕ^hi 35 ts^he33 “car” → tɕ^hi 35 ts^he 553 “little car”
- b. t^hɔŋ 31 “pond” → sai553 t^hɔŋ 31 “little pond”
 sai 31 “fish” → sai553 sai 31 “little fish”

- ✓ Wang remarks that the morpheme [sai 35] “little” is also used for nouns that carry tones other than 31. In other words, there are two ways of expressing diminutivization in Daye : (i) the tonal morpheme 553 replaces the tone of the head noun ; (ii) the morpheme [sai 35] “little” is prefixed to the stem, and carries the tone 553. The first usage is more frequent among speakers.
- ⇒ Why does the tonal morpheme always have a superior duration to that of the lexical tone having a similar contour in Daye as well as in Yue dialects ?

2.5 Origin of *Pinjam*

- ✓ Chao (1947) & Wong (1982): Cantonese *Pinjam* results from the elision of certain morphemes which are no more productive synchronically.
- ✓ Whitaker (1956) drew a more explicit connection between the Cantonese *Pinjam* and the Mandarin suffix [-ɿ], suggesting that the latter is the ultimate source of the Cantonese *Pinjam*. At a later stage, the suffix disappeared but left a trace in the form of *Pinjam*.
- ✓ Whitaker’s theory is based on the distribution of this suffix in the Yue dialects of Bobai. She proposed that the Bobai dialect’s use of the suffix had preserved an earlier historical stage in the development of Yue and thus shed light on its development in Cantonese.

2.6 Wang Li (1931) : Bobai (dialect of the group Yue)

- (10) a. kae32 jin25 “chick”
 iaŋ21 jin25 “little sheep”
 ma21 jin25 “little horse”
- b. ɕek54 “house” → oŋ25 “little house”
 mat32 “thing” → man25 “little thing”
 hɔp4 “box” → hɔm25 “little box”
 pak1 “uncle” → a33-paŋ25 “my little uncle”

- ✓ After suffixation with [jin25] and homorganic nasalization of final stop consonants, diminutivization in Bobai involved change of the original tone to the long rising *Pinjam* without suffixation, a pattern which closely resembles the Cantonese *Pinjam*.
 - ✓ Whitaker (1956) interpreted these three synchronic processes of suffixation as three diachronic stages in the development of the long rising tone: in the first stage the suffix [jin] with a rising tone is used; by the second stage the suffix has been lost but left tonal (long rising tone) and segmental (nasalization of the final occlusive) traces; in the third stage, the nasalization has disappeared, leaving only the long rising *Pinjam*.
3. Compensatory lengthening is not specific to segments
- ✓ O’Melia (1939) and Whitaker (1956) had the intuition that the additional length of *Pinjam* was to compensate the loss of the elided syllable.
 - ✓ A question arises as to the nature of this compensatory lengthening: how do we know if it is the vowel or the tone that lengthens?
 - ✓ **Two possibilities :**
- 3.1 Tone lengthens because of vowel lengthening**
- ✓ Only syllabic constituents and/or melodic segments are capable of lengthening through their association to skeletal positions. Tones, being autosegments, do not have a temporal basis and thus cannot lengthen by themselves.

- ✓ A case of vowel lengthening in closed syllables: *CVCV > CV:C

(11) Friulian (Kavitskaya 2002)

| Latin | | Friulian | | | |
|-------|---|----------|---|------|--------|
| lupum | > | *lupu | > | lo:f | ‘wolf’ |
| novum | > | *novu | > | nu:f | ‘pure’ |
| dekem | > | *detʃe | > | di:ʃ | ‘ten’ |
| nivem | > | *nive | > | ne:f | ‘snow’ |

- ✓ In *CVCV > CV:C, the second vowel in a CVCV sequence is lost with a subsequent lengthening of the preceding vowel. What is the nature of this lengthening?
- ✓ Kavitskaya argues that the inherent phonetic vowel duration of the first vowel in CVCV, being in open syllables, is reinterpreted as phonologically relevant after a change in the conditioning environment (syllable structure).
- ✓ A similar hypothesis is observed in Morin (2007):

(12) Wallon de Liège

a. Open syllables in Western Romance

NĀSŪM > [ne:] "nose"

MÖSĀ > [mu:s] "Meuse"

b. Closed syllables in Western Romance

GRÖSSŪM / GRÖSSĀM > [grɔ̃] / [grɔ̃s] "big"

⇒ Vowel duration in Wallon de Liège is conditioned by the syllable structure of Western Romance: the vowel is phonetically long in open syllables, and short in closed syllables.

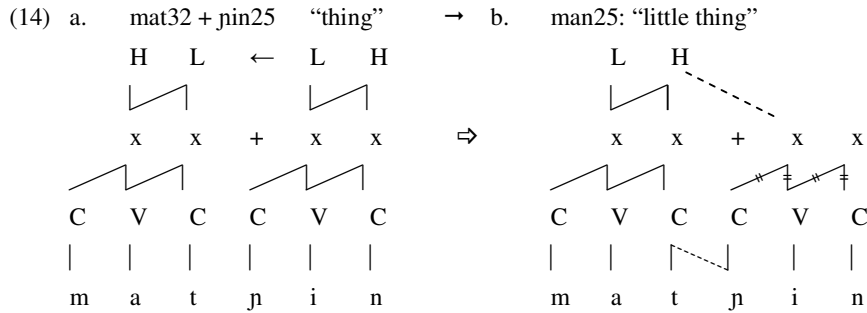
- ✓ On the contrary, there is no long vowel pre-existing to the disappearance of the diminutive suffix in Yue dialects.
- ✓ [mat32 jin25] “thing” (Bobai)
 - ✧ The noun [mat] is closed by a consonant, and the suffix [jin] begins with a consonant too. The vowel of the head noun cannot have a long allophone!

- ✓ The first possibility is thus excluded: vowel lengthening is impossible, and the additional length associated with *Pinjam* doesn’t result from vowel lengthening.
- ✓ If we posit that the codas in Yue are moraic, we will encounter another problem: it is difficult to understand why, in the case of three entering tones, tonal duration is shortened by final stops in closed syllables in Cantonese, whereas the same final stops are capable of bearing a long rising tone in *Pinjam* (cf. /ɔp35/ “little duck”, /kɔp35/ “little pigeon”)

3.2 The only possibility: vowel lengthens because of tone lengthening

- ✓ There is *tonal compensatory lengthening* so that the underlying structure could be preserved. The trigger of the additional duration associated with *Pinjam* is tonal, vowel lengthening being only a correlate of tonal lengthening.
- ✓ Unlike the two types of CL where the process is always accompanied by a change in syllable structure, in Yue, an additional duration is systematically found in *Pinjam* whereas the syllable structure of the head noun remains unchanged: it is always in closed syllables. Given the phonological aberration of vowel lengthening in closed syllables, it is the tone, the only element active, which spreads to the following position released by the elision of the diminutive suffix. We consider that *Pinjam* in Yue dialects constitutes a case of lengthening which is truly compensatory: there is a compensation of the loss of the diminutive suffix by an additional duration associated with *Pinjam*.
- ✓ The successive stages of the development of *Pinjam* in Yue can be illustrated as follows :

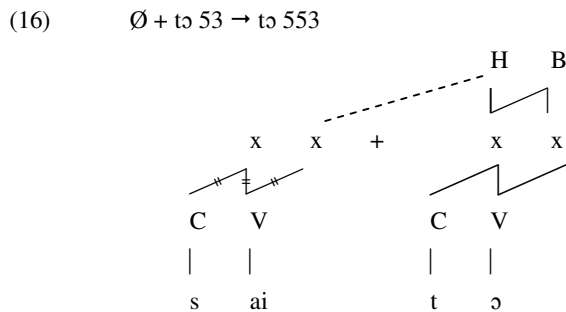
- (13) a. Suffixation
 ⇒ ma21 jin25 “little horse” (Bobai)
- b. Nasalization of the occlusive coda
 ⇒ mat32 “thing” + jin25 → man32 jin25 “little thing” (Bobai)
- c. Suffix loss and emergence of a tonal suffix with compensatory lengthening
 ⇒ tʰɔŋ21 “sugar” → tʰɔŋ35: “candy” (Cantonese)



- ✓ In (14b), the nasal feature provided by the elided diminutive suffix [jin25] nasalizes the coda of the preceding syllable. The tone of the diminutive suffix [jin25] replacing that of the head noun, the second tonal segment of the rising contour, H, expands to fill the vacuum left by the elision of the neighboring syllable.

3.3 Application to Daye

- (15) to 33 “knife” → to 553 “little knife”
- sai 35 + to 33 ⇒ prefixation of the morpheme [sai 35] “little” to the head noun
 - sai 53 + to 33 ⇒ 35 → 53/#__
 - ∅ + to 53 ⇒ substitution of the lexical tone of the stem by the prefix tone
 - to 553 ⇒ spread of the first tonal segment to the preceding position



4. Neutralization in modern Cantonese

- ✓ Neutralization of contrast between the lexical rising tone and the rising tone derived from *Pinjam* in process in modern Cantonese:

“According to both Benedict (1942) and Chao (1947) who were writing their descriptions of Cantonese tones in the 1940’s, the regular high rising tone had a mid to high rising contour of 35, and the high rising *Pinjam* had a long, low to high rising contour of 25:. Based on his experience of learning Cantonese in Guangzhou on 1949-1950, Egerod (p.c. with Bauer, 1994) directly observed this difference in the two tones. However, at some time in the past 50 years the contours of the two tones have become identical and indistinguishable for both Guangzhou and Hong Kong speakers. Speakers now use the mid-low to high rising contour for both tones.” (Bauer & Benedict, 1997)

- ✓ This tendency is also confirmed by a study carried out recently by Yu (2007). He remarks that speakers produce, with subtle phonetic differences, different rising contours derived from *Pinjam*, but are unable to perceive the difference between the lexical rising tone and the derived rising tone.

4.1 Where does this neutralization come from?

⇒ We consider it might be related to verb nominalization through tone change

- ✓ Jiantsung (Yue dialect, data from Mai 1995)

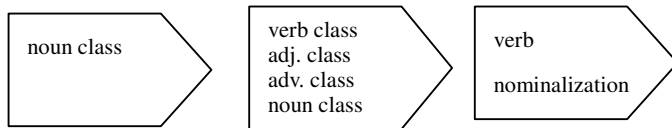
- (17) [toi22] “bag” → elderly speakers
 [toi35] “(small) bag” → young speakers

✧ This phenomenon illustrates that the derived rising tone, as a nominal marker, comes from the diminutive marker.

- ✓ The derived rising tone resulting from the diminutive morpheme has gradually become a derivation marker in adjectival, adverbial and verbal classes, where the function of *Pinjam* is to reduce the force transmitted by verbs or to express an action of short duration.

- (18) a. Xinyi, adjectival class (Ye & Tang 1982)
- | | | | |
|---------------|---------------|--------------|-------------------|
| kam33 tɔ53 | “so numerous” | kam33 tɔŋ | “so few numerous” |
| kam33 tai53 | “so tall” | kam33 taiŋ | “so little” |
| kam33 tʃʰɛŋ11 | “so long” | kam33 tʃʰɛŋŋ | “so short” |
- b. Xinyi, verbal class (Ye & Tang 1982)
- | | | | |
|--------|------------|---------------|-------------------------------|
| mɔ53 | “touch” | mɔ53 mɔnŋ | “touch gently” |
| tʃʰæ23 | “sit down” | tʃʰæ23 tʃʰænŋ | “sit down for a little while” |
| pʰak33 | “hit” | pʰak33 paŋŋ | “hit gently” |
- c. Xinyi, adverbial class (Mai 1995)
- | | |
|-------------|------------|
| tai22 kʰɔiŋ | “probably” |
| læk22 lækŋ | “a little” |
- d. Cantonais, verb nominalization (Yu 2007)
- | | | | |
|-------|------------|-------|-------------|
| sou33 | “to sweep” | sou35 | “a broom” |
| pɔŋ22 | “to weigh” | pɔŋ35 | “a balance” |

(19) Diminutive marker



- ✓ In Yue, the derived rising tone was, at the beginning, a diminutive marker. The diminutivization process has spread to other word classes later on. Given that it is in the nominal class that diminutivization was developed the most completely, and that it is in the nominal class that the rising contour is the most numerous, speakers have taken it as a nominal marker.
- ✓ In Cantonese, we consider that, just as in Bobai, there was a diminutive suffix with a rising contour to produce nominal diminutivization. At a later stage, there were two ways of deriving diminutives: use of diminutive suffix with a rising contour, and tonal replacement by a long rising tone. Diminutivization by tonal substitution has been spreading to all classes of the language, and has become more and more productif and regular. Consequently, it supplanted the diminutive suffix with a

rising contour which was used only in the nominal class. This substitution has provoked the loss of the suffix whose existence became redondant. The suffix loss caused the dissapearance of all traces of affixal positions, so CL cannot occur in modern Cantonese. As a consequence, the rising contour derived from *Pinjam* confused with the lexical rising tone, and become the only marker of diminutivization.

- ✓ In sum, the derived rising contour, which was a diminutive marker in the nominal class, has gradually become a nominal marker and a diminutive marker in other word classes. This grammaticalization process creates new forms, introduces categories which had no linguistic expressions, and transforms the whole system (Meillet 1912).
 - ✓ This grammaticalization is reminiscent of the adverbs formed with *-ly* in English, where three forms were in competition, i.e. suffixation (*-ly*), zero formation (*just, pretty, very*), and compounding (*-wise, -ward, -style*). The derivation by *-ly* has spread later on, and supplanted other forms of adverbial suffixes, such as zero formation (Brinton & Traugott 2002).
5. General discussion:
- 5.1 How can something elided leave a trace?
- ✓ It is well admitted that pretonic syllables such as those in *bañana, Caśsandra* are often omitted by children. Traditional metric hypotheses assume that children have similar lexical representations to those of adults, but production constraints prevent them from pronouncing their targets correctly, which impose a reduced prosodic structure obeying to a trochaic feet (Gerken 1991, Demuth 1995). It follows from these hypotheses that omitted unstressed syllables are absent from children’s output.
 - ✓ Carter & Gerken (2004) consider on the contrary that children simplify their production, deleting only the segmental material of unstressed syllables. The underlying representation of unstressed syllables might be present under the form of compensatory lengthening or other prosodic traces.
 - ✓ They examined the duration of reduced dissyllabic forms pronounced by children, and compared them with dissyllabic forms having a real trochaic structure s-w, i.e.

Cassáandra~Sandy, Lucínda ~ Cindy. Their phonetic study shows that the average duration of verb-to-noun is longer for reduced formes (“_cinda”, “_sandra) than for non reduced forms (“Cindy”, “Sandy”). The same thing goes for *Pinjam* in Yue dialects, where the additional tonal duration preserves the underlying structure of the diminutive suffix.

(15)

| | Disyllabic target names | Trisyllabic target name |
|---------------------------|--------------------------------------|--|
| Monosyllabic verbs | He pushed Sandy. He pushed Cindy. | He pushed Cassandra. He pushed Lucinda. |
| Disyllabic verbs | He pushes Sandy. He pushes Cindy. | He pushes Cassandra. He pushes Lucinda. |

⇒The average duration of verb-to-noun (He pushed Sandy vs He pushed Cassandra) was analyzed in order to see if there was a trace left by an omitted syllable.

6. Theoretical implications of the present hypothesis

- ✓ It has been shown that tones cannot be treated as pure melodies in Chinese dialects: they do have direct access to skeletal positions.
- ✓ Tones have the same status as syllabic components (onset and rime) *vis-à-vis* the skeleton.
- ✓ A conjecture based on the segmental compensatory lengthening will encounter one problem: if the additional tonal duration had to be explained by the compensatory lengthening of vowels, no change in length would be expected to occur in closed syllables.
- ✓ Now, the additional length is observed in both open and closed syllables in *Pinjam*. Consequently, it is tone that lengthens under syllable elision, not vowel. In other words, the vowel lengthens under the pressure of the tone, not the tone under the pressure of the vowel.

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