Compensatory lengthening is not specific to segments[1]

Te-hsin Liu, Paris 8 University
liu.tehsin@gmail.com

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 ancient 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 syllable, 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

t^{h}oi21	"terrace"	t^{h}oi35	"table"
k^{wh}ɐn21	"skirt"	wɐi21 k^{wh}ɐn35	"apron"
kɛŋ33	"mirror"	ŋan23 kɛŋ35	"eyeglasses"
t^{h}ɔŋ21	"sugar"	t^{h}ɔŋ35	"candy"
nøy23	"female"	nøy35	"girl"
ɒp3	"duck"	~	ɒp35
kɒt2 tsɒt2	"cockroach"	~	kɒt2 tsɒt 35
kɒp3	"pigeon"	~	kɒp35

(2) Verb nominalization

Level tone		Rising tone	
sou33	"to sweep"	sou35	"a broom"
pɔŋ22	"to weigh"	pɔŋ35	"a scale"
wɑ22	"to listen"	wɑ35	"an utterance"
tan22	"to plunk"	tan35	"a missile"

(2) Omission of perfective marker and potential marker

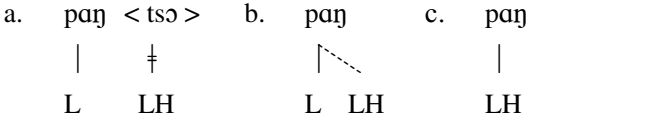
a.	pɑŋ22 tsɔ35	→	pɑŋ35	"to weigh (PERFECTIVE)"
	fan22 tsɔ35	→	fan35	"to transgress (PERFECTIVE)"
	ki:n33 tsɔ35	→	ki:n35	"to meet (PERFECTIVE)"
b.	pɔŋ22 tɐk55	→	pɔŋ35	"to weigh (POTENTIAL)"
	fan22 tɐk55	→	fan35	"to transgress (POTENTIAL)"
	ki:n33 tɐk55	→	ki:n35	"to meet (POTENTIAL)"

2.1 Traditional representations of rising contour derived from *Pinjam*

✓ Yip (1980) et Chen (2000)

(5)

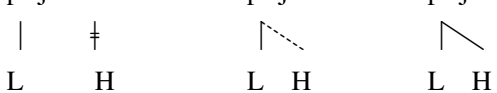
(6) pɑŋ22 tsɔ35 → pɑŋ35 "to weigh (PERFECTIVE)"



[1] My cordial thanks are due to Joaquim Brandão de Carvalho, Jean-Marc Beltzung and Naomi Yamaguchi for helpful discussions.

(7) pɔŋ22 tɐk55 → pɔŋ35 "to weigh (POTENTIAL)"

a. pɔŋ <tɐk> b. pɔŋ c. pɔŋ



L H L H L H

✓ 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).

d. Establishing a correspondence between the Mandarin diminutive suffix [-ɽ] 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?

2.2 Origin of *Pinjam*

✓ Chao (1947) & Wong (1982): Cantonese *Pinjam* result 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 [-ɽ], 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.

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

(8) a.

kae32 ɲin25	"chick"
iaŋ21 ɲin25	"little sheep"
ma21 ɲin25	"little horse"

b.

œk54	"house"	→	oŋ25	"little house"
mat32	"thing"	→	man25	"little thing"
hɔp4	"box"	→	hɔm25	"little box"
pak1	"uncle"	→	a33-paŋ25	"my little uncle"

✓ After suffixation with [ɲin25] 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 [ɲin] 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

✓ Since Goldsmith (1976), 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.

✓ However, 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.

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

(9) Friulian (Kavitskaya 2002)

a. 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):

(10) Wallon de Liège

a. Open syllables in Western Romance
NĀSŬM > [ne:] "nose"
MŎSĂ > [mu:s] "Meuse"

b. Closed syllables in Western Romance
GRŎSSŬM / GRŎSSĂM > [grŏ] / [grŏs] "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 ɲin25] "thing" (Bobai)

✧ The noun **[**mat**]** is closed by a consonant, and the suffix **[**ɲin**]** 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.

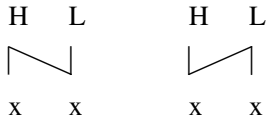
3.2 Vowel lengthens because of tone lengthening

✓ The additional length associated with *Pinjam* can be explained by assuming

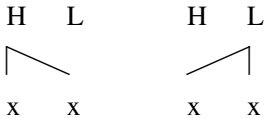
that tones are ***intrinsically positional objects***, and, more specifically, that they make up a universal periodic skeleton HLHL (Carvalho 2002).

✓ The interaction between tones and temporal positions is proposed as follows; the register is represented by the spreading of a tonal segment to an adjacent position.

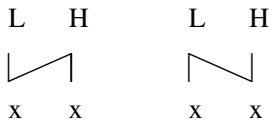
(11) a. falling contour tone



b. level tones



c. rising contour tone



⇨ The capital letter indicates the register.

✓ The successive stages of the development of *Pinjam* in Yue can be illustrated as follows :

(12) a. Suffixation

⇨ ma21 ɲin25 "little horse" (Bobai)

b. Nasalization of the occlusive coda

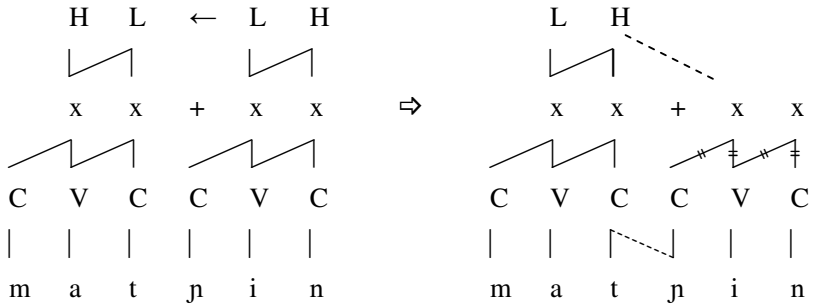
⇨ mat32 "thing" + ɲin25 → man32 ɲin25 "little thing" (Bobai)

c. Suffix loss and emergence of a tonal suffix with compensatory lengthening

⇨ t^hɒŋ21 "sugar" → t^hɒŋ35: "candy" (Cantonese)

(13)

a. mat32 + ɲin25 "thing" → b. man25: "little thing"



✓ In (13b), the nasal feature provided by the elided diminutive suffix [ɲin25] nasalizes the coda of the preceding syllable. The tone of the diminutive suffix [ɲin25] 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.

4. Theoretical implications of the present hypothesis

✓ It has been shown that tones cannot be treated as pure melodies in Chinese dialects: they do have ***a temporal basis***.

✓ Tones have the same status as syllabic components (onset and rime) *vis-à-vis* the skeleton.

✓ **Prediction:** the substitution of segmental primes shall not preclude tonal stability.

✧ This prediction is attested in Chinese secret languages (*Fanqie* languages), where segmental melodies are replaced under reduplication while tones remain stable (Liu 2007).

✓ 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.

5. Appendix - Tonal markedness

a. Analogy between CVCV and HLHL

- ✓ The falling tone HL is unmarked by comparison with the rising tone LH, because the latter supposes two empty positions on its right and left sides.
- ✓ Level tones are, in Asian languages, more marked than contour tones since their lexical representations involve an empty position. See (11b).
- ✓ If the nucleus is said to be the sonority peak since Sievers (1876) and Jespersen (1912), we might ask what the tonality peak is in the tonal domain. From an acoustic point of view, the high tone is more prominent than the low one (de Lacy 2002). Let us hypothesize that it has the same status as the nucleus in the syllable skeleton. Consequently, just as V is structurally unmarked compared with C, H should be unmarked by comparison with L. The existence of low level tones, structurally marked, should imply the presence of high level tones.

b. Typological evidence

- ✓ In a statistics on 187 tonal languages, Zhang (2002) noticed that 37 languages have a falling tone without a rising one. Only three languages have a rising tone without a falling one: Margi, Lealao Chinantec and Zengcheng.
- ✓ A language can have only contour tones without level tones, as in Chengtu, Shanghai, Zhenhai, Pingyao and Wuxi, while no Chinese language has only level tones.
- ✓ The unmarkedness of the high level tone compared with the low level tone is supported by the typology: in Cantonese, Tianjin, and Taiwanese, the low level tone and the high level tone coexist; Mandarin has only the high level tone without its low counterpart.

6. References

Bao, Zhiming. (1990). *On the Nature of tone*. Ph.D. dissertation, MIT.

Bao, Zhiming. (1999). *The Structure of Tone*. Oxford, Oxford University Press.

Bauer, Robert S., and Paul K. Benedict. 1997. *Modern Cantonese phonology*. Berlin: Mouton de Gruyter.

Benedict (1942). *Cantonese Phonology*, ms.

Carvalho, J. Brandão de (2002). *De la syllabation en termes de contour CV*, Mémoire d'habilitation à diriger des recherches, Paris, EHESS

Chao, Yuan Ren (1947). *Cantonese Primer*. Mass: Havard.

Chao, Yuan Ren (1959). The morphemic status of certain Chinese tones. in *Transactions of International Conference of Orientalists in Japan* IV:44-48

Goldsmith, John. (1976). *Autosegmental phonology*. Cambridge, Mass.; MIT Ph.D. dissertation. Distributed by Indiana University Linguistics Club. Published by Garland Press, New York, 1979.

Jespersen, Otto. 1912. *Lehrbuch der Phonetik*. Teubne, Leipzig and Berlin.

Kavitskaya, Darya (2002). *Compensatory lengthening: phonetics, phonology, diachrony***.** New York ; London : Routledge.

de Lacy, Paul. (2002) : *The formal expression of markedness*. PhD dissertation, University of Massachusetts, Amherst.

Lam, Kin-ping (2002). *A Study of Intonation in Hong Kong Cantonese*. Doctoral dissertation, Chinese University of Hong Kong.

Liu, Te-hsin (2007). *Reduplication as Evidence for the Skeletal Nature of Tones*, ms.

Liu, Te-hsin (To appear). A fresh look at the paradoxical nature of Chinese contour tones, In *Online ConSOLE-proceedings*.

Luo, Jian-jun (2006). The sound compound words of the spoken language in Daye Chengui dialect, *Journal of Hubei Normal University* 4:78-81

Mai, Yun (1995). *InYun u Fangyen Yenjio* (Phonologie et études des dialectes). Guangdong People Press.

Morin, Yves Charles (2007). *Sources et évolution des distinctions de durée vocalique en gallo-romain*. Paper presented at the conference GalRom07 - Diachronie du gallo-roman, Nice, 15-17 January.

O'Melia, Thomas. (1939). *First Year Cantonese*. Hong Kong Maryknoll House, Hong Kong.

Sundberg, Johan. (1973). Data on maximun speed of pitch changes. *Speech Transmission of Technology*. Stockholm, Sweden.

Sievers, Eduard. (1876). *Grundzüge der Lautphsiologie zur Einführung in das Studium der Lautlehre indogermanischen Sprachen*. Beitkopf und Härtel, Leipzig.

Tsao, Feng-Fu (2006). On Grammaticalization Cycle, *Hanyu Xuebao* 2: 2-15, Hubei Education Press.

Wang, Guosheng. (1996). Hubei Daye hua de qingyi biandiao (Emotive tone sandhi in the dialect of Daye, Hubei). *Zhongguo Yuwen* 355-360

Whitaker, K. P. K. (1956) A study on the modified tones in spoken Cantonese. *Asia Major* 184-207

Wang, Guosheng (1996). Emotive tone sandhi in the dialect of Daye, Hubei, *Zhongguo Yuwen* 1996, 355-360

Ye, Guocheng & Tang, Zhidong (1982). Xinyi Fangyan de Pianjam (Les tons modifiés dans le dialecte de Xinyi), *Fangyan* 1982, 47-51

Yip, Moira. (1980). *The Tonal Phonology of Chinese*. Ph.D. dissertation, MIT.

Yip, Moira (1989). Contour Tones, *Phonology* 6, 149-174

Yu, Alan (2007). Understanding near mergers: the case of morphological tone in Cantonese. *Phonology* 24 (1): 187-214

Yue-Hashimoto, Anne. (1972). *Phonology of Cantonese*. Cambridge: Cambridge University Press.

Zhang, Jie. 2002. *The effects of duration and sonority on contour tone distribution*. New York, Routledge.