

Verbal Reduplication in Mandarin Chinese: An Analysis at Syntax-Phonology Interface

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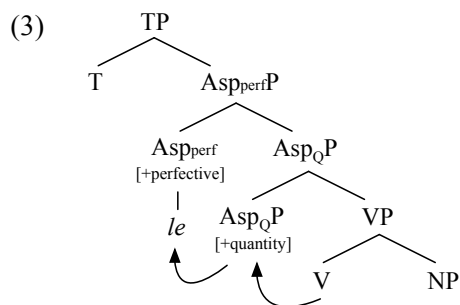
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1. Introduction

Problem 1: *le* ‘infixation’

- (1) a. *xiang.le.xiang* think.PERF.think (‘think a little / for a short while’)
b. **xiang.xiang.le* think.think.PERF
c. *tao.lun.le.tao.lun.* discuss.PERF.discuss (‘discuss a little / for a short while’)
d. **tao.lun.tao.lun.le* discuss.discuss.PERF
 - (2) Possible Impossible
verb.le.RED * verb.RED.le
- Verb reduplication can be analyzed as an **aspectual projection** (Y. Li 2000, Deng 2013, Sui and Hu 2016), situated below the perfective aspect in a layered analysis of aspectual projections (cf. Liao 2004, Tsai 2008).



How to account for the ordering of suffix *le* and the reduplicant, which, in general, both require to be adjacent to the verbal root?

Problem 2: Surface tonal patterns

- (4) a. *kan*⁵³.*kan*⁰ look.look
b. **kan*⁵³.*kan*⁵³
c. *kan*⁵³.*yi*⁰.*kan*⁵³ look.one.look
d. *kan*⁵³.*le*⁰.*kan*⁵³ look.PERF.look

The reduplicants in (4c-d) are not toneless, as observed in Li & Thompson 1981 and Paris 2001.

- Is tone copied or not?
- Does the difference indicate that AA, A-le-A and A-yi-A have distinct structures, only AA being genuine verb reduplication?

Problem 3: Variation

The acceptability of (5a)—the reduplication of disyllabic verb with *le*—varies, while (5b) AB.yi.AB, the variation of AB.AB, is categorically ungrammatical.

(5) Results on the acceptability of some verb reduplication forms

	<i>Verb Reduplication</i>	<i>gloss</i>	<i>informants who accept</i>	<i>note</i>
a.	<i>tao.lun.le.tao.lun</i>	discuss.PERF.discuss	47	AB. le .AB
b.	<i>tao.lun.yi.tao.lun</i>	discuss.one.discuss	0	*AB. yi .AB
c.	<i>kan.yi.kan</i>	look.one.look	102	*A. yi .A
	Total No. of informants		102	

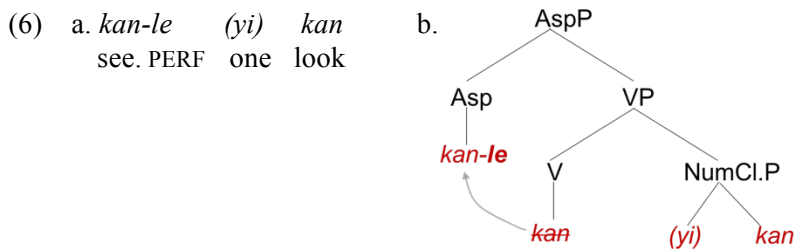
The claims on the acceptability of ‘AB.le.AB’ made in literatures

- ok: Y. Li 2000, 2002; *: Sui and Hu 2016; ?: Deng 2013

Under what analysis can we account for the acceptability in (5a) while ruling out (5b)?

2. The syntax of verb reduplication

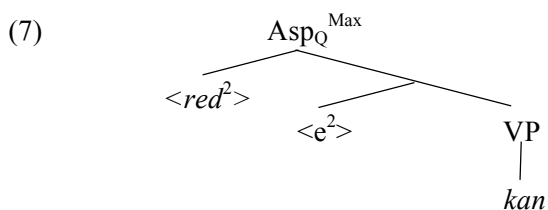
Under the “verb-classifier” analysis in (6b), the problem 1 (“A-le-A” vs. “*A.A-le”) would be dismissed.



- Such analysis is seen in Fan 1964, Zhu 1982, Xiong 2016.

2.1 Verb reduplication as a head feature assigning range to Asp_Q

We treat verb reduplication as a head feature assigning quantity range to an aspectual head (see Borer 2005 for the exo-skeletal theory).



2.2.1 The abstract meaning of verb reduplication

Synchronically, verb reduplication is a grammaticalized *tentative / delimitative* aspect (cf. Chao 1968, Li and Thompson 1981, Smith 1991& 1994, among others).

- (8) 师乃拈一枝吹两吹，度与百丈。（南宋《五灯会元》卷九）
...chui liang chui
blow two blow
(Southern Song Dynasty (13c.); Unacceptable in modern Chinese)

2.2.2 The reduplication of non-activity, non-volitional verbs

Only activity and volitional verbs can be reduplicated (cf. Chao 1968, Li and Thompson 1981, Zhu 1982, among others). *However*:

- (9) a. Ta bu ai wo, wo jiu bu neng **ai.yi.ai** ta ?
she not love I I then not can love.one.love her
'Even if she doesn't love me, can't I love her for a little bit?' (Q. Chen 2001, (25))
- b. Rang ta **sheng.sheng** xiaohai, jiu zhidao zuo muqin de ganku le.
make her birth.birth baby then know be mother DE hardship LE
'Let her try to give birth to a baby; she'll know the hardship of being a mother.' (L. Chen 2001, (7))
- c. Deng renmen ba zhe-jian-shi **wang.wang** zai shuo ba.
wait people BA this.Cl.thing forget then talk Part.
'Let's wait for people to forget this thing for a while and then talk about it.' (L. Chen 2001, (11))

- (10) *si* 'die', *bing* 'be sick', *sha* 'kill', *xing* 'be surnamed', etc.

2.2.3 The availability of idiomatic reading with reduplication

- (11) a. bao fo.jiao.
clasp Buddha.foot
Idiomatic reading: 'make a last-minute effort'
Literal reading: 'clasp the Buddha (statue's) foot'
- b. Ta kaoshi qian **bao.le** **san.xia** fo.jiao.
he tests before clasp.PERF three.times Buddha.foot
(Literal reading only)
- c. Ta kaoshi qian **bao.le.bao** **fo.jiao**.
he tests before clasp.PERF.clasp Buddha.foot
(Both idiomatic and literal reading possible)

2.2 *le* 'infixation' as a result of diachronic process

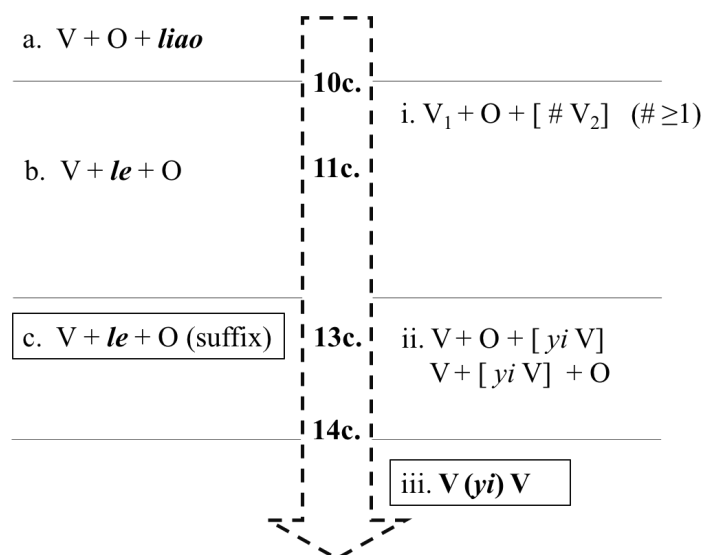
- le* became a suffix (i.e., taking the privileged position immediately following a verbal root) before the second V was reanalyzed as a verb copy.
- A generalized alignment constraint encodes this privileged status of suffix *le* in synchronic grammar.

ALIGN (*le*, L, Root, R):

Assign a violation mark if the left edge of perfective marker *le* is not aligned with the right edge of the verbal root.

(12) **The grammaticalization of *le***
(Ota 1958, J. Liu et al.1992, Jiang 1994, Cao 2000, among many others):

The grammaticalization of VV
(Ota 1958, Fan 1964, Chao 1968, Y.Liu 1983, Zhang 2000, among others):



2.3 Interim summary

- Synchronically, verb reduplication is functional in nature and the verbal classifier analysis is unattainable. This analysis leads to the competition between the two suffixes in alignment.
- ALIGN-*le* requires *le* to take up the privileged position. This generalized alignment constraint is justified by the diachronic evolutionary processes.

3. The phonological analysis of verbal reduplication

- With the input **Verb-RED-*le*** generated by syntax, as well as the alignment constraint motivated by historical evidence, we are going to show:
 - 1) BR-Correspondence and ALIGN constraints can predict the shape and position of RED
 - 2) the surface tonal patterns are closely related to metrical structure

3.1 Derive the surface shape and linear order

Crucial Constraints:

- **MAX-BR**: The segments in the base must be maximally preserved in the reduplicant (McCarthy and Prince 1995)
- **INTEGRITY**: Assign one violation mark for each segment in the input that has multiple correspondents in the output. (McCarthy and Prince 1995)
- **LINEARITY(SEG)**: If the linear order of the segments in the input is not kept in the output, assign a violation mark. (cf. Lin 2015:853)
- **ALIGN (*le*, L, Root, R)**: Assign a violation mark if the left edge of perfective marker *le* is not aligned with the right edge of the verbal root. ('*le*' must immediately follow a verbal root).

(13)

	/k ^h an _{ROOT} + RED + lə/	ALIGN- <i>le</i>	MAX-BR	LINEARITY	INTEGRITY
☞ a.	kan.le.kan			1	3
b.	kan.kan.le	1W		L	3
c.	kan.le.ka		1W	1	2L

(Note: the reduplicant is underlined)

(14)

	/t ^h ao.lun _{ROOT} + RED + lə/	ALIGN- <i>le</i>	MAX-BR	LINEARITY	INTEGRITY
☞ a.	t ^h ao.lun.lə.t ^h ao.lun			1	6
b.	t ^h ao.lun.t ^h ao.lun.lə	1W		L	6
c.	t ^h ao.lun.lə.t ^h ao		3W	1	3L

3.2 Derive the surface tonal patterns

3.2.1 Dual Trochee

- In the following analysis, we will adopt the **Dual Trochee** system proposed by Duanmu (1999, 2007, 2014, etc.)
- Mandarin Chinese, Shanghainese and Japanese, etc. have dual trochee: both syllabic and moraic trochee.

(15) The well-formed/ill-formed trochees (adapted from Duanmu 2007:139):

<i>Well-formed trochee</i>		<i>Ill-formed trochee</i>	
$\begin{array}{cc} (\sigma & \sigma) \\ \wedge & \wedge \\ (\mu\mu) & . (\mu\mu) \end{array}$	$\begin{array}{cc} (\sigma & \sigma) \\ \wedge & \\ (\mu\mu) & . \mu \end{array}$	$\begin{array}{cc} (\sigma & \sigma) \\ & \\ \mu & . \mu \end{array}$	$\begin{array}{cc} (\sigma & \sigma) \\ & \wedge \\ \mu & . (\mu\mu) \end{array}$
heavy – heavy	heavy – light	light – light	light – heavy

(Note: ‘σ’ – syllable; ‘μ’ – mora; ‘()’ – foot boundary; bold face – foot head)

- Tone-Stress Principle:** A stressed syllable can be assigned a lexical tone or pitch accent; An unstressed syllable is not assigned a lexical tone or pitch accent. (Duanmu 2014:428)

3.2.2 The analysis

Crucial Constraints:

- *NON-HEAD/TONE:** In a *syllabic trochee*, assign a violation mark for every non-head syllable that carries lexical tone (cf. Yip 2001, Lee-Kim 2016).
- MAX-TONE-BR:** Assign a violation mark for every RED that has no corresponding tone to the base.
- MAX-TONE-ROOT:** Assign a violation mark for every tone in the root that is deleted.
- *RED(T):** There must be no tones in reduplicant (Yin 2008:38).

1) Verb+RED

- In Standard Mandarin, the reduplicant in VV is surfaced as a neutral tone¹ (e.g. kan⁵³.kan⁰)

(16) *kan.kan* ‘watch/read a little bit’

	kan ⁵³ + RED	MAX-T-RT	*NON-HD/T	MAX-T-BR	*RED(T)
☞ a.	$\begin{array}{cc} (\sigma & \sigma) \\ \wedge & \\ (\mu\mu) & . \mu \\ 53 & 0 \\ \text{kan} & \underline{\text{kan}} \end{array}$			1	
b.	$\begin{array}{cc} (\sigma & \sigma) \\ \wedge & \wedge \\ (\mu\mu) & . (\mu\mu) \\ 53 & 53 \\ \text{kan} & \underline{\text{kan}} \end{array}$	1W			1W

¹ In the following analysis, five-point scale will be used to indicate tones, and ‘0’ refers to the neutral tone. Although the marker ‘le’ is underlyingly toneless, it can acquire surface tones in different contexts, such as a high tone when it is preceded by tone 3 (‘xiang²¹.le⁵.xiang²¹’). Apart from this context, the marker ‘le’ is always specified as a default low tone, and it is simply viewed as a neutral-toned syllable in the surface.

2) Verb (monosyllabic) +RED+le

- When both RED and *le* come into the picture, i.e. ‘*kan.le.kan*’, the metrification is different
- The tone of the reduplicant in ‘*kan.le.kan*’ is not neutralized, though it is less prominent than the tone of the base.
- How to predict ‘*kan*⁵³.*le*⁰.*kan*⁵³’?

(17) *kan.le.kan* ‘have watched/read for a little while’

/k ^h an ⁵³ _{ROOT} + RED + lə/			ALIGN- <i>le</i>	*NON-HD/T	MAX-T-BR	*RED(T)
a.	(σ (μμ) 53 kan	(σ μ 0 le	(σ (μμ) 53 <u>kan</u>			1
b.	(σ (μμ) 53 kan	(σ μ 0 le	(σ μ 0 <u>kan</u>		1W	L
c.	(σ (μμ) 53 kan	(σ (μμ) 53 <u>kan</u>	(σ μ 0 le	1W	1W	1

- the reduplicated ‘*kan*’ is less prominent and it is actually shorter than the base ‘*kan*’.
- Since the whole output ‘*kan.le.kan*’ can be viewed as a prosodic word (the stem plus the following affixes), the base ‘*kan*’ can be viewed as the element in the head foot, which has greater prominence.

3) Verb (disyllabic) +RED+le

(18) *tao.lun.le.tao.lun* ‘discuss a little bit’

/t ^h ao.lun _{ROOT} + RED + lə/			ALIGN- <i>le</i>	MAX-T-RT	*NON-HD/T	MAX-T-BR	*RED(T)
a.	(σ (μμ) 21 tao	(σ (μμ) 53 lun	(σ μ 0 le	(σ (μμ) 21 <u>tao</u>	(σ (μμ) 53 lun	1	2
b.	(σ (μμ) 21 tao	(σ (μμ) 53 lun	(σ μ 0 le	(σ μ 0 <u>tao</u>	(σ μ 0 lun	1	2W

Summary:

- The constraints can predict the shape and position of RED
- Metrical structure plays an important role in predicting surface tonal patterns
- The reduplicant in ‘Verb+RED+le’ is not neutralized (cf. Li & Thompson 1981, Paris 2011). But this evidence does not support the argument that VV and VleV are different in that only VV involves reduplication.

3.3 Rule out *AB.yi.AB

(19) Results on the acceptability of some verb reduplication forms (repeat (4))

	<i>Verb Reduplication</i>	<i>gloss</i>	<i>informants who accept</i>	<i>note</i>
a.	<i>tao.lun.le.tao.lun</i>	discuss.PERF.discuss	47	AB. le .AB
b.	<i>tao.lun.yi.tao.lun</i>	discuss.one.discuss	0	*AB. yi .AB
c.	<i>kan.yi.kan</i>	look.one.look	102	*A. yi .A
Total No. of informants			102	

What does syntax tell us?

- ⇒ The reduplicant in verbal reduplication is an exponent of an aspectual projection
- ⇒ ‘Verb + RED’ expresses a different meaning from a bare verb
- ⇒ ‘Verb + RED + *le*’ contains two affixal elements

- ‘Verb + RED + *le*’ can be viewed as a prosodic word (cf. Li 2010)²
- The unacceptability of ‘*tao.lun.yi.tao.lun*’ is attributed to the restriction of prosodic word of Mandarin

Size of Mandarin prosodic word

- In a natural production experiment by Guo (2016), 99.74% of the identified prosodic words are less or equal to four syllables.
- Various researchers also suggest four syllables could be the maximal size of Mandarin prosodic words (e.g. C. Zhang 2000, D.Deng et al. 2007, H.Wang 2008, etc.)

A hypothesis about the size of Mandarin prosodic word:

- 1) Mandarin has lexical stratification, and the size restriction of prosodic word can be different for native words and loan words³;
- 2) In terms of the native words, the maximal size of a prosodic word does not exceed four syllables. (*PRWD_{NATIVE} > 4σ)

The acceptability of ‘tao.lun.yi.tao.lun’

- RED and *yi*-RED can be viewed as free variation: no semantic differences
- The interaction of **REALIZE MORPHEME** and the size restriction of prosodic word result in the unacceptability of ‘*tao.lun.yi.tao.lun*’

Constraints:

- **REALIZE MORPHEME (RM)**: Every morpheme in the input should have some phonological exponence in the output. (cf. Walker 2000)
- **ALIGN(PRWD, L, ROOT, L)**: Assign a violation mark if the left boundary of the prosodic word is not aligned with the left boundary of the root morpheme.
- ***PRWD_{NATIVE} > 4σ**: In the native Mandarin lexicon, assign a violation mark for every extra syllable if a prosodic word exceeds four syllables

(20)

	tao.lun + {RED, <i>yi</i> -RED}	RM	ALIGN- <i>le</i>	ALIGN (PRWD, L, ROOT, L)	*PRWD _{NATIVE} > 4σ
☞ a.	[<i>tao.lun.tao.lun</i>] _{prwd}				
b.	[<i>tao.lun.yi.tao.lun</i>] _{prwd}				1W
c.	[<i>tao.lun</i>] _{prwd} . [<i>yi.tao.lun</i>] _{prwd}			1W	

² Li (2010:167): a prosodic word in Chinese should contain at least one syllable with full tone ... and the affixes, together with the stem that they attach to, form a prosodic word.

³ See Ito and Mester (1999, 2001, etc.) for the discussion of lexical stratification; see Kim (2012) for the lexical stratification in Mandarin. Kim (2012) mentions three main types of loan words in Mandarin, i.e. Japanese graphic loans, semantic loans and alphabetic loans, among which the alphabetic loans are the least restricted in terms of prosodic word size.

(21)

	tao.lun + {RED, yi-RED} + le	RM	ALIGN- le	ALIGN (PRWD, L, ROOT, L)	*PRWD _{NATIVE} > 4σ
a.	[tao.lun.le.tao.lun] _{prwd}				1
b.	[tao.lun.le] _{prwd} ·[tao.lun] _{prwd}			1W	L
c.	[tao.lun.tao.lun] _{prwd}	1W			L
d.	[tao.lun.le.yi.tao.lun] _{prwd}				2W

(Note: This tableau leads to further discussion of the acceptability issue of ‘tao.lun.le.tao.lun’, and its metrical pattern, which will not be discussed in detail here.)

4. Conclusion

To summarize,

- Verb reduplication is an aspectual functional projection in syntax and cannot be analyzed as a verbal classifier structure.
- The generalized alignment constraint ALIGN-*le*, justified on the ground of diachronic processes, determines the output order of ‘verb-*le*-reduplicant’.
- The metrical structure of Mandarin Chinese, coupled with ALIGN-*le*, gives rise to the attested surface tonal patterns; no stipulation needed.
- The acceptability of AB-*le*-AB in contrast with *AB-yi-AB is attributed to the size restriction of Mandarin prosodic word, formalized based on the previous generalizations and intuitions.

Further issues:

- To model and test the across-speaker variation on the acceptability of AB-*le*-AB (cf. (19a))
- To account for a further variation: some Mandarin speakers with southern dialect background can accept the order ABAB-*le* (while rejecting AA-*le*), which is not acceptable by most Beijing Mandarin speakers.

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