

Lexical Category Specific Constraints: Mandarin Verb versus Adjective Reduplication

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This paper addresses the two reduplication patterns in Mandarin Chinese where a disyllabic verb in the form of /AB/ (where A and B are syllables) is reduplicated as [ABAB] while a disyllabic adjective is reduplicated as [AABB]. Chen (2000) claims that the Chinese minimal rhythmic unit (MRU) is structured disyllabically. Both [ABAB] and [AABB] have a prosodic structure of $(\sigma\sigma)(\sigma\sigma)$. Based on the difference between [AABB] and [ABAB] in their tone sandhi behaviors, the morphological structure for [ABAB] is claimed to be the same as its phonological structure. However, the morphological structure for [AABB] is misaligned with its phonological structure. The different prioritization of LINEARITY with respect to the alignment constraints (ALIGN(Verb, MRU) and ALIGN(Adjective, MRU): Align the edges of the verb/adjective morpheme with the edges of MRU) explains their different reduplication patterns. The AAB pattern for V-O verbs further supports the claim that it is necessary to have lexical category specific constraints.

1. Introduction

In its commonly seen form, reduplication creates new words by affixing to all or part of the base word. Most of the time, the base and reduplicant have a boundary that can be easily identified. For example, a hypothetical input /bati/ could be reduplicated as [batiti]¹, [babati], [batibati] or [batibati] in different languages. In all these cases, it is easy to tell what is the base and what is the reduplicant and where the boundary is. Although in the [batibati] case, it is not very clear which [bati] is the base. It could presumably be decided by investigating other phonological processes. With all the above said, Chinese reduplication for adjectives do not fit into this category. For an adjective base /kāntʃìŋ/ 'clean', the reduplicated form is [kān kāntʃìŋtʃìŋ] 'clean (intensified)' in which the base and reduplicant are interleaved. It is difficult to tell where the morphological boundary is.

At the same time, Chinese has a verb reduplication in which for a base /tʃʰiŋtʃʰu/ 'celebrate', the replicated form will be [tʃʰiŋtʃʰutʃʰiŋtʃʰu] 'celebrate a little'. The generalization is that for adjectives, the pattern of reduplication is AABB while the pattern for verbs is ABAB. (Here both A and B refer to one syllable and since Chinese has the property of having primarily monosyllabic morphemes, both A and B are very likely to be one morpheme too.) Some verbs and some adjectives have both patterns available and it is always the case that the AABB reduplicated form matches with an adjective while the ABAB form matches with a verb.

This paper focuses on the phonological and morphological aspects of the phenomenon. Reduplication has initiated a lot of interesting work in recent years, especially in the framework of Optimality Theory (Prince and Smolensky, 1993). The problem that these Chinese data pose is explaining what is the driving force that makes the pattern ABAB match to an output of a verb while the pattern AABB matches to an adjective and why there are verbs that undergo AAB reduplication rather than ABAB. This paper gives an analysis of these patterns within the framework of OT and claims that the different patterns we see in Chinese are within the predictable range given by the ranking of the universal constraints. What are needed are some constraints that are specific to lexical categories. This kind of constraint has been proposed by Smith (1997, 2001), who claims that noun-

¹ The underlined part denotes the reduplicant.

faithfulness constraints are universally higher ranked than verb-faithfulness constraints. The phenomenon is elusive at the first sight because of the fact that these patterns are driven by both phonological and morphological constraints and their interactions. Reduplication is treated here as multiple correspondence between the input and output (Struijke, 2000). A deviation from Struijke's proposal of multiple correspondence is that the reduplication realized by multiple correspondence is considered to incur a violation of a faithfulness constraint: INTEGRITY-IO.

The organization of the paper is as follows. First, the data is introduced in Section 2. In Section 3, I give a general account for why for both AABB and ABAB reduplication, the output is of four syllables instead of two or three. The choice of optimal output is narrowed down to the AABB and ABAB pattern for reduplication of disyllabic verbs and adjectives. This account is mainly based upon the consensus among Chinese linguists that Chinese words have a tendency of being disyllabic prosodically. Section 4 investigates the possible third tone sandhi patterns of AABB and ABAB, claiming that there is a different morphological organization for AABB and ABAB. Section 5 gives an OT analysis showing why the ABAB pattern occurs for verb reduplication while the AABB pattern matches with adjectives. The ranking of alignment constraints for verbs and adjectives with LINEARITY gives the expected pattern. Section 6 gives an account of the AAB pattern for V-O verbs and proposes noun-specific integrity and its ranking with the general INTEGRITY-IO. Section 7, draws a conclusion and calls for further research.

2. Data

The following data² shows the different reduplication patterns in Chinese. (1) and (2) show, respectively, that the pattern is ABAB for verbs while for adjectives, the pattern is AABB.

(1) Verb reduplication: ABAB pattern

Base	Gloss	Reduplication	Gloss
tɕ ^h iŋtɕ ^w ù	“celebrate”	tɕ ^h iŋtɕ ^w ùtɕ ^h iŋtɕ ^w ù	“celebrate a little”
tásǎu	“clean up”	tásǎutásǎu	“clean up a little”
tɕǝŋli	“put in order”	tɕǝŋli tɕǝŋli	“put things in order”

(2) Adjective reduplication: AABB pattern

Base (adj.)	Gloss	Reduplication	Gloss
kāntɕiŋ	“clean”	kānkāntɕiŋtɕiŋ	“clean” (intensified)
m ^ɿ iŋpái	“clear”	m ^ɿ iŋ m ^ɿ iŋpáipái	“clear” (intensified)

(3) and (4) shows that for some adjectives and some verbs, both AABB and ABAB patterns are available and the lexical categories of the reduplicated forms match the patterns (*i.e.*, reduplicated forms with an AABB pattern always function as adjectives and those with an ABAB pattern always function as verbs).

(3) Adjective->AABB and ABAB

Base(verb)	Gloss	Reduplication	Gloss
kāuɕiŋ	“happy”	kāukāuɕiŋɕiŋ	“happy”(intensified)
		kāuɕiŋkāuɕiŋ	“have some fun”
tɕ ^h iŋtɕ ^w ūŋ	“relaxed”	tɕ ^h iŋtɕ ^h iŋtɕ ^w ūŋtɕ ^w ūŋ	“relaxed”(intensified)
		tɕ ^h iŋtɕ ^w ūŋtɕ ^h iŋtɕ ^w ūŋ	“relax a little bit”

(4) Verb->ABAB and AABB

Base(verb)	Gloss	Reduplication	Gloss
tɕs ^ɿ dian	“suggest”	tɕs ^ɿ t ^ɿ ǎntɕs ^ɿ t ^ɿ ǎn	“comment here and there”
		tɕs ^ɿ tɕs ^ɿ t ^ɿ ǎnt ^ɿ ǎn	“critical, bossy”

² The data are collected by the author, a native speaker of Chinese.

jauxy	“yo-ho”	jauxyjauxy	“do some yo-heave-ho”
		jaujauxyxy	“noisy”

Not all adjective or verbs can undergo reduplication. Li and Thompson (1981) claim that there does not appear to be any rule governing which adjectives can be reduplicated and which adjectives cannot. The following contrasts are adopted from Li and Thompson (1981):

Jiandan	“simple”;	jianjiandandan	“simple” (intensified)
fuzha	“complex”;	*fufuzaza	
rongyi	“easy”;	*rongrongyiyi	

The verbs that could undergo the ABAB reduplication have the internal structure of Verbal morpheme+Verbal morpheme. A big part of Chinese verbs are formed by V-O compounding, for example *chifan* “eat” in which *chi* is the verb for “eat” while the *fan* is the object part meaning “meal”. It is the same for *tiaowu* “dance”, *shuijiao* “sleep”, etc. The reduplication pattern for these verbs takes the form of AAB, where the verb part is reduplicated.

(5) Verb->AAB

Base	Gloss	Reduplication	Gloss
t ^h iauwu	“dance”	t ^h iaut ^h iauwu	“dance a little bit”
tʂifan	“eat”	tʂitʂifan	“eat a little bit”
ʂeitʂau	“sleep”	ʂeiʂeitʂau	“sleep a little bit”

Semantically speaking, the base and the reduplicated form (both ABAB and AAB) of the verb differ slightly in meaning. The base form refers to an event while the reduplicated form refers to several actions. Take /dasao/ as an example.

- (6) Ta zhengzai dasao.
He is now cleaning-base.
He is cleaning.
- (7) *Ta zhengzai dasaodasao.
He is now cleaning-reduplicated
He is cleaning (reduplicated form).

The contrast between base and reduplicated form is related to the use of *zhengzai* “right now” which can only refer to one event. So use of *dasaodasao* together with *zhengzai* makes the sentence ungrammatical. For the past and future tenses, the contrast does not exist.

Similarly, the adjective base form is used to describe one state, while the reduplicated form is used to describe a continuous state. In the following example, the reduplicated form could not be used in the sentence with *jintian* “today”, but is acceptable in sentence (9) with *zhengtian* “every day”.

- (8) Ta jintian hen piaoliang.
She today very pretty-base
She is pretty today.
- (9) *Ta jintian hen piaoliangpiaoliang.
She today very pretty-reduplicated
She is pretty today (reduplicated form).
- (10) Ta zhengtian piaopiaoliangliang.
She all the time pretty-reduplicated.
She is pretty all the time (reduplicated form).

In summary, Chinese adjectives and verbs show different patterns of reduplication. Within verbs, different morphological structures determines different reduplication patterns for VV verbs and VO verbs, ABAB and AAB respectively.

3. Size of the AABB and ABAB reduplication

It has long been observed among Chinese linguists that Chinese words tend to be disyllabic (Lǚ 1963, Zhou 1964, Chen 1979, Shih 1986, Duanmu 1999). Chen (2000) gives several strong supports for his claim on the disyllabicity requirement of Chinese words. First, most lexical entries in contemporary Chinese are polysyllabic. Statistically, 85% of all nouns in a survey of 3,000 high-frequency expressions are disyllabic or longer. To meet this requirement of disyllabicity, some monosyllabic morpheme has to be combined with another monosyllabic morpheme with the same meaning to form an independent word, for example, in *mei-li* “beautiful”, both *mei* and *li* mean “beautiful” but are combined to make up the word. For some foreign names, monosyllabic ones must be lengthened in some way. Chen (2000) gives the example for the translation of “(Bernard) Shaw” which is referred to not as *Xiao, but Xiao-shi (Shaw+Mr.). At the same time, I found that for the shortening of foreign names, a similar thing happens. For example, “Shakespeare” is shortened not as *Sha, but as Sha-wong (Sha + respectful term). At the same time, foreign names that are originally disyllabic do not go through the process of augmentation or shortening, for instance, “Mary” is translated as *mali* which are of two syllables.

More importantly, Chen (2000) claims that monosyllabic words that do exist in the lexicon cannot occur freely in actual speech. This is very obvious when we look at the different answers to “What is your last name” from a Chinese with a monosyllabic last name (for example chen) and another Chinese with a disyllabic one like si-ma; The former will answer “Wo xing cheu”(“My last name is Chen”) while the latter will just say “Si-ma”.

The ideal word is not only at least disyllabic but also no more than two syllables. Some trisyllabic expressions tend to shorten, e.g. *wai-guo-yu* ‘foreign language’ is shortened to *wai-yu* ‘foreign language’ in normal usage. Statistically speaking, disyllabic $[\sigma\sigma]$ and quadrisyllabic $[\sigma\sigma\sigma\sigma]$ compounds, set phrases, and idioms by far outnumber trisyllabic $[\sigma\sigma+\sigma]/[\sigma+\sigma\sigma]$ and quadrisyllabic $[\sigma\sigma\sigma+\sigma]/[\sigma+\sigma\sigma\sigma]$ expressions. (Lǚ, 1963).

In analyzing the Chinese Minimal Rhythmic Unit (MRU), which is the next prosodic unit larger than foot, it is considered as a domain for analyzing the phonological processes such as tone sandhi. Chen (2000). To represent the trend of disyllabicity, Chen uses the following constraints:

Binarity: The MRU is at least disyllabic.

Boundedness: The MRU is at most disyllabic.

For the purpose of simplicity, I will use $MRU=2$ as the constraint to force the MRU to be disyllabic.

$MRU=2$: the MRU must be disyllabic.

Because this constraint is ranked higher than INTEGRITY-IO, the reduplication is realized as four syllables instead of three syllables.

- (11) INTEGRITY-IO: (“No Breaking”) (McCarthy & Prince, 1995)
No element of the input has multiple correspondents in the output.

Here there is a departure from Struijke’s proposal of multiple correspondence where she argues that GEN always establishes multiple correspondence in the presence of a reduplicative morpheme, and therefore INTEGRITY-IO is not relevant in morphological reduplication. I am not assuming that the reduplicative morpheme comes with multiple correspondence, but rather, multiple correspondence is motivated by the phonological requirement of disyllabicity and the morphological requirement of realizing the reduplicative morpheme. An input with multiple correspondents in the output is

considered violating INTEGRITY-IO. See Feng (2001, 2002) for the same claim about Chinese diminutive affixation.

(12) Multiple correspondence between input and output:



The following tableau shows the interaction between MRU=2 and INTEGRITY-IO. MRU=2 outranking INTEGRITY-IO determines that a candidate like AAB or ABB will be ruled out.

(13) Tableau 1. MRU=2 >> INTEGRITY-IO

/AB+RED/	MRU=2	INTEGRITY-IO
∅(AB)(AB)		**
∅(AA)(BB)		**
(ABB) ³	*!	*
(AAB)	*!	*

A candidate that should be considered is the completely faithful candidate: (AB) which does not realize the reduplication morpheme. The constraint that requires the phonological realization of morpheme is proposed in Samek-Lodovici (1993) and Gnanadesikan (1997), and is developed in Walker (2000) as in the following:

(14) REALISE-μ: A morpheme must have some phonological exponent in the output.

With REALISE-μ outranking INTEGRITY-IO, it rules out the fully faithful candidate as can be seen in the following tableau:

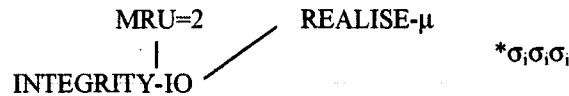
(15) Tableau 2. REALISE-μ >> INTEGRITY-IO

/AB+RED/	REALISE-μ	INTEGRITY-IO
∅(AB)(AB)		**
∅(AA)(BB)		**
(AB)	*!	

With the above said, there are still two other candidates that could survive the above constraints: AAAB or ABBB. They are both ok with regard to LINEARITY, MRU=2 and REALISE-μ. They tie with the AABB and ABAB with respect to INTEGRITY-IO violations. It might conceivably be because of MAX-BR. However, MAX-BR does not seem to be the appropriate constraint in this analysis since the base-reduplicant correspondence is not assumed throughout the paper. Besides, it has been observed that three consecutive syllables are not a good structure. Nelson (2002) notices a similar case in Yoruba, where there is a trend for the reduplication to be the size of four syllables. For a base of /baba/, to satisfy the size requirement, it is supposed to be reduplicated as [babababa]. However, the output is in fact [babaraba], implying that there is an avoidance of three same consecutive syllables. Based on this, I propose there is a constraint banning three same syllables in a row: *σ_iσ_iσ_i. (the same index *i* of the syllables implies that they are the same syllable).

To summarize, the reduplication of a base in the form of /AB/ takes the pattern of ABAB or AABB due to the higher ranking of constraints like: LINEARITY, MRU=2 and REALISE-μ over INTEGRITY-IO. At the same time, a general ban on three identical syllables in a row *σ_iσ_iσ_i rules out candidates like AAAB or ABBB. The summary ranking so far is as follows:

³ The ABB pattern does exist in Chinese, but the BB part is considered as a reduplicative suffix. AB is not the base for the reduplication. I am not considering them the same as the ones dealt with in this paper.



4. Morphosyntactic structure of reduplicated adjectives and verbs

Section 3 has shown that with regard to MRU organization, there is no difference between the prosodic structure of AABB and ABAB; they are both organized as $(\sigma\sigma)(\sigma\sigma)$. In order to solve the puzzle as to why AABB goes to an adjective while ABAB goes to a verb, let us look at their morpheme structures. For a language in which each syllable has a separate meaning, it is difficult to decide on the morpheme structure from the surface. The phenomenon of tone sandhi in Mandarin could indicate what the morphosyntactic structure is due to the special morphosyntactic requirement of its application.

Mandarin has the following tone system.

T1	high level	[55]	ma	“mother”
T2	rising	[35]	ma	“hemp”
T3	low dipping	[214]	ma	“horse”
T4	falling	[51]	ma	“to scold”

Mandarin tone sandhi refers to the phenomenon that the first T3 becomes T2 when two underlyingly third tones T3 are adjacent.

(16) Tone sandhi rule: $T3 \rightarrow T2 / __ T3$

For example, *ni-hao* (“how are you?”) contains two syllables *ni* and *hao* both of which have an underlyingly third tone. The third tone of *ni* becomes a second tone when it is followed by *hao*.

When there are three adjacent syllables with T3, tone sandhi will apply first to the minimal morphosyntactically related two syllables and if the environment of tone sandhi still exists, tone sandhi applies again. The classical example is given in Chen (2000):

(17)	[lao- hu] dan	“tiger gall, brave”
	3 3 3	
→	2 3 3	T3 sandhi
→	2 2 3	T3 sandhi

(18)	zhi [lao- hu]	“paper tiger, coward”
	3 3 3	
→	3 2 3	T3 sandhi

In both (18) and (19), tone sandhi applies to [lao-hu] “tiger” first. For (18), there is still two adjacent T3, so tone sandhi applies again. In (19), tone sandhi does not apply after the first application. This phenomenon could presumably be analyzed in OT. Since this is not the focus of this paper, I will stay with the rule-based approach for the time being.

Actually, for the right-branching expressions like (19), Mandarin allows two alternative readings while (18) has only one tone pattern.

(18')	[lao- hu] dan	“tiger gall, brave”
(a)	2 2 3	OK
(19')	zhi [lao- hu]	“paper tiger, coward”
(a)	3 2 3	normal tempo
(b)	2 2 3	allegro speech

Shih (1986, 1997) claims that the reason for the possible tone pattern of (19'b) is that in allegro speech, the internal structures are ignored and are treated as unstructured sequences of syllables. She argues that the default phonological processing is left to right, which means phonologically people will

start speaking the words of a sentence from left to right. For a right branching structure like (19), two tone patterns are possible including the default one. For an originally left branching structure, the processing in normal tempo and allegro speech is the same. We do not get an extra right to left processing tone pattern.

In the data of verb bases that have both an AABB and ABAB reduplication patterns, /zhidian/ ‘suggest, comment’ has two syllables both with T3. For the two patterns ABAB and AABB, the numbers of tone patterns differ too.

- (19) ABAB pattern
zhi dian zhi dian “give some comments here and there”
2 3 2 3 OK
- (20) AABB pattern
zhi zhi dian dian “critical, bossy”
2 3 2 3 OK
2 2 2 3 OK

The fact that the ABAB pattern has only one tone pattern suggests that it has the left branching morphosyntactic structure. The morpheme structure should be [AB][AB] since AB on its own could be an independent morphological constituent. For AABB, we get two tone patterns, suggesting a right branching for the morphosyntactic structure. There are different possibilities of right branching. I claim the structure should be [A[AB]B] which could be seen from the last reading for the AABB pattern: the second A and the first B get the first application of tone sandhi, then tone sandhi applies on the first B since it is followed by the second B. This is true also in the respect that [AB] is an independent morphological constituent while [AA], [BB] or [ABB] could not be.

The claim that the morphosyntactic structure of AABB is [A[AB]B] has further support from a Chinese southern dialect, Fuzhou dialect, which has the same form of adjective reduplication. Qu (1995), in a rule-based approach, considers the process of the reduplication of A1A2B1B2 as prosodic circumscription which accesses both edges of bimorphemic words, enabling both A and B to undergo reduplication respectively.

In terms of the MRU structure, the fact that there is an additional tone pattern for AABB reduplication indicates that the MRU structure for AABB is not as simple as just (AA)(BB). Chen (2000) claims that when morphosyntactic structures exist in a phrase or a word, the constraint “NoStraddling” plays a role. Chen’s definition of “NoStraddling” is as the following: Immediate constituents must be MRU-mates. (Chen, 2000). In both AABB and ABAB patterns, the immediate constituents are A and B with different morphosyntactic structures shown as the following:

- (21) Morphosyntactic structures:



In the above configuration, the A and B with subscripts are considered immediate constituents. ABAB does not violate NoStraddling while AABB does. In terms of OT, this would mean that the configuration of right part is the optimal one for both ABAB and AABB pattern. However, this is not the fact. The fact is that AABB has one extra tone pattern than ABAB, indicating it has an extra MRU pattern which I claim is (AABB) and it does not violate NoStraddling but violates MRU=2.

For verb reduplication, no matter how NoStraddling and MRU=2 is ranked, (AB)(AB) is going to be the optimal output as shown below.

Tableau 3 VERB:NoStraddling, MRU=2 ()MRU, [] morphosyntactic

/AB-Verb +RED/	NoStraddling	MRU=2
∅[(AB)][(AB)]-V.		
[(AB)][(AB)]-V.		*

However, for adjective reduplication, the ranking between NoStraddling and MRU=2 will give us different outputs.

Tableau 4 ADJECTIVE: NoStraddling >> MRU=2

/AB-Adj. +RED/	NoStraddling	MRU=2
([A[A](B[B])]-Adj.	*!	
* ([A[AB]B])-Adj.		*

Tableau 5 ADJECTIVE: MRU=2 >> NoStraddling

/AB-Adj. +RED/	MRU=2	NoStraddling
* ([A[A](B[B])]-Adj.		*
([A[AB]B])-Adj.	*!	

Tableau 4 shows that with NoStraddling ranking over MRU=2 it will yield (AABB) as the optimal MRU structure of AABB while tableau gives (AA)(BB) as the MRU structure by ranking MRU=2 over NoStraddling. Tone sandhi operates within MRUs and both MRU structures are possible for AABB, thus AABB has two tone patterns. The two tone patterns are made available by the free ranking of NoStraddling and MRU=2.

In summary, the different ways of tone sandhi application for AABB and ABAB shows that AABB has one variation of MRU structure, which is consistent with the fact that AABB has one extra tone pattern when tone sandhi is applicable. The variation of tone patterns in AABB is explained by the free ranking of NoStraddling and MRU=2.

5. Why adjective → AABB, verb → ABAB?

With the above analysis in mind, we are ready to solve the puzzle as to why the AABB pattern always produces an adjective while the ABAB pattern always produces a verb. Section 3 shows both AABB and ABAB patterns have the MRU organization of $(\sigma\sigma)(\sigma\sigma)$ available. Section 4 shows that the morpheme structure of ABAB is [AB][AB] which matches well with its MRU organization, but the morpheme structure of AABB is [A[AB]B] which does not match with its MRU organization. This difference motivates two different ALIGNMENT constraints:

Following generalized alignment (McCarthy and Prince 1993b), ALIGN(Verb, PCat) requires the edges of the verb to be aligned with the edges of a prosodic category. ALIGN(Adjective, PCat) requires the edges of the adjective to be aligned with the edges of a prosodic category. For simplicity, I evaluate these two ALIGNMENT constraints categorically, assigning one star for violation of it without counting the degree of violation.

(22) ALIGN(Verb, MRU): Align the edges of the verb morpheme with the edges of MRU.

(23) ALIGN(Adjective, MRU): Align the edges of the adjective morpheme with the edges of MRU.

With only the above two constraints, we can not distinguish the patterns yet. The reason is that the ABAB pattern will be the perfect one for both verb and adjective reduplication. It is necessary to look at which constraint ABAB pattern violates and which one AABB obeys.

Following Struijke(1998), I assume multiple correspondence between input and output instead of referring to BR-correspondence. The following correspondence is assumed for both reduplication patterns:

(24) Multiple correspondence between input and output:



As shown, the configuration above shows line crossing for the ABAB representing a violation of LINEARITY, which requires that the linear order in the input is kept in the output.

- (25) LINEARITY: S1 is consistent with the precedence structure of S2, and vice versa.
(McCarthy, 1996)

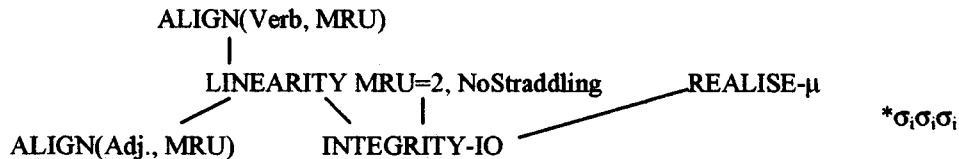
With LINEARITY sandwiched between the two ALIGNMENT constraints, the following tableau shows the result that ABAB goes to verb reduplication while AABB goes to adjectives.

(26) Tableau 6: ALIGN(MRU, Verb)>> LINEARITY>> ALIGN(MRU, Adj.)

/AB-Verb, RED/	ALIGN(Verb, MRU)	LINEARITY ⁴	ALIGN(Adj., MRU)
☞ [(AB)][(AB)]-V.		*	
(A[A]B[B])-V.	*!		
/AB-Adj, RED/	ALIGN(Verb, MRU)	LINEARITY	ALIGN(Adj., MRU)
[(AB)][(AB)]-Adj.		*!	
☞ (A[A]B[B])-Adj			*
☞ (A[AB]B)-Adj			*

Combining the ranking we get in section 2, the overall ranking for Chinese verb and adjective reduplication is as follows:

- (27) Summary ranking:



6. AAB Pattern for V-O verbs

As mentioned in the introduction, the reduplication pattern ABAB is available to those verb bases that have the verb morpheme + verb morpheme while AAB is the reduplication of verbs that have the verb + object structure. The data is repeated below:

(28)

Base	Gloss		Reduplication	Gloss
t ^h iauwu	'jump-dance'	"dance"	t ^h iaut ^h iauwu	"dance a little bit"
t ^s ifan	'eat-meal'	"eat"	t ^s it ^s ifan	"eat a little bit"
ʒeit ^ɕ au	'sleep-a sleep'	"sleep"	ʒeʒeit ^ɕ au	"sleep a little bit"

The observation is that unlike the ABAB pattern, the B part of these verbs do not reduplicate. The B part is the object part and is nominal in nature. When we look at the pattern of noun reduplication in Chinese, this will follow through.

Only monosyllabic nouns and classifiers in Chinese reduplicate, as shown below:

⁴ Again, for the sake of simplicity, a single "*" is used to mark an instance where there is one B preceding A, the linear order of which is different from the input A>B. The original definition of LINEARITY does not make it clear as to how to evaluate its violation and it calls for further research into the nature of the constraint and see whether there should be two versions of LINEARITY, a universal one and an existential one.

(29)

n ¹ an	“year”	n ¹ am ¹ an	“every year”
ɕe	“month”	ɕeɕe	“every month”
pɛi	“cup”	pɛi pɛi	“every cup”

But disyllabic nouns or classifiers do not reduplicate:

(30)

çəŋtɕi	“week”	*çəŋtɕiçəŋtɕi	*çəŋçəŋtɕitɕi
çauŋi	“hour”	*çauŋi çauŋi	*çauçauŋiŋi
tɕ ^h apei	“teacup”	*tɕ ^h apeitɕ ^h apei	*tɕ ^h atɕ ^h apeipei

In order to mean “every week, every month and every teacup,” *meige* “every” will be used before the nouns. There is no reduplication available for the disyllabic nouns or classifiers. This contrast between monosyllabic and disyllabic nouns could be solved by employing a lexical category specific faithfulness constraint INTEGRITY-NOUN which forbids the reduplication of nouns.

(31) INTEGRITY-NOUN: No element in the input with noun feature has multiple correspondents in the output.

Lexical category specific constraints have been proposed by Smith (1997, 2001). Her claim is that noun-faithfulness constraints are universally higher ranked than verb-faithfulness constraint. The claim here that there is an INTEGRITY constraint specific to nouns (and is higher ranked than the general INTEGRITY constraint, shown later) is compatible with Smith’s claim. This constraint is overridden by a minimal word requirement which Chen (2000) uses as Binariness: $MRU \geq 2$ which is equal to a more general constraint commonly used for minimal word effect: $LWORD = PWORD$ (Every Lexical Word must correspond to a Prosodic Word (Prince and Smolensky 1993)). For the monosyllabic nouns: $LWORD = PWORD$ ranks over INTEGRITY-NOUN and INTEGRITY-IO, resulting in the reduplication of monosyllabic nouns.

(32) Tableau 7: $LWORD = PWORD \gg INTEGRITY-NOUN, INTEGRITY-IO$

/A _n +RED/	LWORD=PWORD	INTEGRITY-NOUN	INTEGRITY-IO
a. AA		*	*
b. A	*!		

For disyllabic nouns, $LWORD = PWORD$ is satisfied without reduplication. However, there is a worry that if we have $LWORD = PWORD$ high-ranked over integrity, it might require all words in Chinese to obey this constraint. The result will be that all Chinese words become disyllabic. This, however, may actually answer the question why Modern Chinese has the trend of being disyllabic. For those monosyllabic words that still exist in Chinese, there might be higher ranking faithfulness constraint ruling out the possibility for them to be disyllabic. On the other hand, disyllabic nouns, which already obeys $LWORD = PWORD$, reduplication is not realized in order not to violate INTEGRITY constraints:

(33) Tableau 8: $LWORD = PWORD \gg INTEGRITY-NOUN, INTEGRITY-IO$

/A _n B _n +RED/	LWORD=PWORD	INTEGRITY-NOUN	INTEGRITY-IO
a. AABB		*!	**
b. ABAB		*!	**

There is no optimal output shown in tableau 8 because the actual output is actually *meige* AB “every AB” whose violation of constraints is not easy to evaluate. The actual form of *meige* AB seems to suggest that there is no reduplication, thus a reduplicative morpheme is not realized. This indicates a REALIZE- μ violation. However, if we look at the definition of REALIZE- μ : A morpheme must have

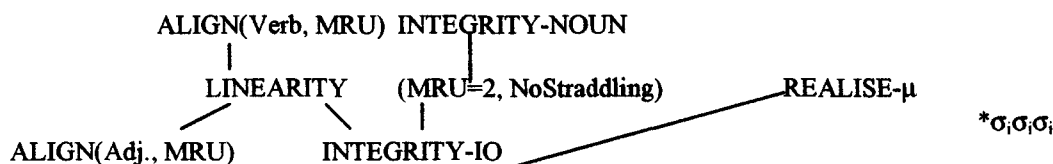
some phonological exponent in the output. If we assume that the morpheme in the input for the meaning of “every” is two allomorphs: RED and *meige*, then REALIZE- μ is satisfied in the *meige* AB case. The actual realization of the morpheme takes the form of non-reduplication because reduplication will violate the INTEGRITY constraints. For the moment, I will leave it for future investigation as to what is the constraint that is been violated by *meige* AB.

When we turn back to the AAB reduplication, the fact that there is this noun-specific integrity constraint explains why the noun part of AB is not reduplicated.

(34) Tableau 9: REALISE- μ , MRU=2 >> INTEGRITY-NOUN >> INTEGRITY-IO

/A _v B _n +RED/	REALISE- μ	INTEGRITY-NOUN	MRU=2	INTEGRITY-IO
a. (A _v B _n)(A _v B _n)		*!		**
b. (A _v A _v)(B _n B _n)		*!		**
c. (A _v B _n B _n)		*!	*	*
d. (A _v B _n)	*!			
e. (A _v A _v B _n)			*	*

Combining the constraint ranking from the previous sessions, the summary ranking for Chinese verb and adjective reduplication is given below.



7. Conclusion

This paper has addressed the puzzle in Chinese verb and adjective reduplication patterns. Reduplication is considered as multiple correspondence between the input and the output and reduplication on its own is a violation of INTEGRITY-IO. By first looking at the MRU organization of the reduplicated forms, I claim that both AABB and ABAB patterns have the MRU organization as (σσ)(σσ). With the same prosodic structure, AABB and ABAB, however, have different morphosyntactic structures based on their different tone behaviors. This leads to the conclusion that for verb and adjective reduplication, there are different well-formedness constraints: ALIGN(Verb, MRU) and ALIGN(Adj., MRU). The ranking of these two constraints with LINEARITY explains the existence of the two patterns of verb and adjective reduplication.

The AAB reduplication pattern for V-O verbs is investigated and it is found that the reason that these verbs do not reduplicate into the ABAB pattern is due to the higher-ranking INTEGRITY constraint specific to nouns. All of the analyses of the three patterns have employed lexical category specific constraints: either specific to the well-formedness alignment constraint or faithfulness constraint integrity. The analyses show the necessity of having these lexical specific constraints, and at the same time, leave the questions as to what typological prediction will these lexical specific constraints have.

The present research provokes some questions for further research. The analysis has shown that adjective reduplication is more obedient to linearity requirement than verbal reduplication. Another pattern of reduplication exists for some adjectives in Chinese (which is available to some of the adjectives that have AABB as their reduplication pattern.), which has the form of A[li]AB. Most of these adjectives have a negative meaning and [li] is fixed for all these adjectives. This A[li]AB pattern obeys linearity as well and this pattern is not available for verb reduplication. Whether this pattern could support the claim that adjective reduplication in Chinese is more sensitive to linearity requirement or not needs further investigation. Another related question is why Chinese nouns are more resistant to reduplication than other lexical categories and it is worth checking whether nouns are

more resistant to other phonological changes as well. It would be worthwhile to examine reduplication in other languages for patterns that show specificity to lexical categories. Sino-Korean has the AABB reduplication pattern and it should be first investigated whether this pattern is borrowed lexically from Chinese and whether the lexical category-sensitivity still exists after the borrowing.

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