Non-concatenative Effects of Mora Affixation: An OT Analysis of Huozhou Diminutive Formation

Yifan Yang
University of Southern California
yangyifa@usc.edu

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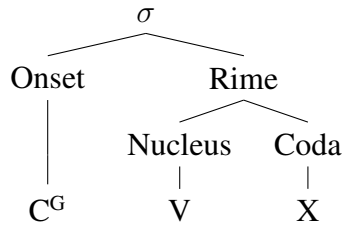
1 Overview

1.1 Background

(1) **Huozhou Chinese**[霍州話]:

- spoken in south-central Shanxi Province;
- a variation of Zhongyuan Mandarin[中原官話] (Hou and Wen 1993, Shen 2003).

(2) **Syllable structure**: Huozhou Chinese has the same syllable structure as Standard Mandarin. Duanmu's (1990, 2007) model of Chinese syllable structure will be used throughout the paper (X = /j,w,ŋ/ in Huozhou Chinese):



(3) Other key properties of **Huozhou phonology**:

Table 1. The final (onglide+rime) inventory of Huozhou Chinese(J.Tian 2009:4-5)

ɿ		a	o	ə		aj	ej	aw	əw	ɑŋ	əŋ
ɻ				ər							
i	ɯ	ʲa			ʲɛ	ʲaj		ʲaw	ʲəw	ʲɑŋ	iŋ
u		ʷa	ʷo			ʷaj	ʷej			ʷɑŋ	uŋ
y		ᵠa	ᵠo		ᵠɛ					ᵠɑŋ	yŋ

Table 2. The lexical tones of Huozhou Chinese

	T1	T2	T3	T4	T5
source	*yin-ping*	*yang-ping*	*shang*	*yin-qu*	*yang-qu*
X.Tian (1992)	11	35	33	55	53
Hou and Wen (1993)	213	35	33	55	51
J.Tian (2009)	21	35	332	55	51
Shen et al. (2010)	212	35	33	55	53

1.2 Diminutive formation in Huozhou Chinese: a sketch

(1) Diminutive formation is the most notable morphophonological phenomenon in Huozhou Chinese.

(2) Diminutives can occur in three forms(X.Tian 1992:5-7):

- Reduplication (Table 3.a)
- Rime change (the sound change on the rime part of a syllable; literal translation of '變韻')(Table 3.b)
- Both reduplication and rime change (as is described in the literature)(Table 3.c)

Table 3. A sketch of Huozhou diminutive formation

	stem	*gloss of stem*	*diminutive form*	*note*
a.	[s^wa^{21}]	'brush'	[$s^wa^{21}s^wa^{332}$]	full reduplication
b.	[$k^w\alpha\eta^{55}$]	'jar'	[k^wa^{55}]	rime change
c.	[$k^w\alpha\eta^{55}$]	'jar'	[$k^w\alpha\eta^{55}k^wa^{332}$]	both reduplication and rime change

(3) The problems:

(a) What is the underlying representation of the diminutive morpheme?

(b) How to give an economical explanation of the form [$k^w\alpha\eta^{55}k^wa^{332}$] (table 3.c)? Is this form a combination of reduplication and rime change?

(c) How to explain the variation in table 3.b and table 3.c?

1.3 Aims of this talk

(1) Give a unified and economical account of the complicated patterns, i.e. all the forms can be attributed to **mora affixation**.

(2) Add new data to the theoretical literature of mora affixation.

(3) Enrich the typology of affixation in Chinese languages proposed by Lin (1997, 2004).

2 Huozhou diminutive formation: the data

(1) The description and discussion of Huozhou phonology and diminutive formation mainly come from four sources throughout the literature:

- X.Tian (1992)
- Hou and Wen (1993)
- J.Tian (2009)
- Shen, Feng, and Tsumura (2010)

(2) The data from all the sources have been examined in order to confirm the basic patterns, but I mainly follow the notation and description of **J.Tian (2009)** and **Shen et al. (2010)** since these are the most recent and detailed studies on Huozhou dialect.

2.1 Rime change and reduplication

(1) Diminutive formation: All the sources have reported that both rime change and reduplication can be used to form diminutives.

(2) **Rime change** is the segmental and/or tonal change occuring in the rime of a stem syllable (see Lin 1993, 2004 for detailed discussion). The paradigm of rime change in Huozhou Chinese is listed below:

Table 4. Paradigm of Huozhou diminutive rime change (adapted from J.Tian 2009:54)[1]

basic finals		*diminutive*	*basic finals*		*diminutive*
ɑŋ, aj	⟶	a	əŋ	⟶	ɯ
^{j}ɑŋ	⟶	^{j}a	iŋ	⟶	i
^{w}ɑŋ, ^{w}aj	⟶	^{w}a	^{j}əw	⟶	y
^{ɥ}ɑŋ	⟶	^{ɥ}ɑ	aw	⟶	o/u
^{w}ej, əw, uŋ	⟶	u	^{j}aw	⟶	^{ɥ}o
yŋ	⟶	y	ej	⟶	u

- All the closed rimes, except for [^{j}aj], can undergo rime change.
- The rime change in Huozhou Chinese is manifested as **coda deletion**. (**Note**: There are also some subsegmental processes during rime change, but they are not the main focus of this paper.)
- Hence, the so-called 'rime change' can be viewed as **subtractive morphology**.

(3) **Reduplication** is another common way to form diminutives.

[1]The last form, 'ej → u', is not documented either in J.Tian (2009) or Hou and Wen (1993), but reported in X.Tian (1992) and Shen et al. (2010). Apart from this one, all the other forms have been consistently reported by all these researchers.

(4) Examples of diminutive formation in Huozhou Chinese are given in Table 5, followed by generalizations:

Table 5. Examples of diminutive formation (J.Tian 2009:54-57)

		stem noun	*diminutive*	*gloss of the noun*
(a)	1.	[ts^{h}a^{55}]	[ts^{h}a^{55}.ts^{h}a^{332}]	'pocket'
	2.	[s^{w}a^{21}]	[s^{w}a^{21}.s^{w}a^{332}]	'brush'
	3.	[ŋə^{35}]	[ŋə^{35}.ŋə^{55}]	'moth'
	4.	[x^{w}a^{21}]	[x^{w}a^{21}.x^{w}a^{332}]	'flower'
(b)	5.	[ts^{h}ɑŋ^{35}]	[ts^{h}a^{35}]	'silkworm'
	6.	[tɕiŋ^{51}]	[tɕi^{51}]	'well'
	7.	[p^{h}əŋ^{35}]	[pu^{35}]	'washbasin'
	8.	[kaj^{55}]	[ka^{55}]	'lid'
(c)	9.	[p^{h}ɑŋ^{35}]	[pa^{55}] or [p^{h}ɑŋ^{35}.pa^{55}]	'plate'
	10.	[kaj^{55}]	[ka^{55}] or [kaj^{55}.ka^{332}]	'lid'
	11.	[lɑŋ^{35}]	[la^{35}] or [lɑŋ^{35}.la^{55}]	'basket'
	12.	[p^{h}əŋ^{35}]	[pu^{35}] or [p^{h}əŋ^{35}.pu^{55}]	'washbasin'
	13.	[t^{h}uŋ^{35}]	[t^{h}u^{35}] or [t^{h}uŋ^{35}.t^{h}u^{21}]	'bucket'
	14.	[saj^{21}]	[sa^{21}] or [saj^{21}.sa^{332}]	'sieve'
(d)	15.	[tɕ^{hj}aw^{35}]	[tɕ^{hɥ}o^{35}.tɕ^{hɥ}o^{55}]	'slip'
	16.	[t^{h}əw^{51}]	[t^{h}u^{51}.t^{h}u^{21}]	'bean'
	17.	[ȵ^{j}əw^{35}]	[ȵy^{35}.ȵy^{55}]	'longhorn beetle'
	18.	[paw^{21}]	[po^{21}.po^{332}]	'bun'
(e)	19.	[fɑŋ^{51}.k^{w}ɑŋ^{51}]	[fɑŋ^{51}.k^{w}a^{51}]	'restaurant'
	20.	[pu^{55}.t^{h}aj^{332}]	[pu^{55}.t^{h}a^{332}]	'bag'
	21.	[pu^{35}.t^{h}aw^{55}.kɑŋ^{21}]	[pu^{35}.t^{h}aw^{55}.ka^{21}]	'raisin'
	22.	[tɕ^{hj}aw^{35}.x^{w}o^{55}.m^{j}ɑŋ^{332}]	[tɕ^{hj}aw^{35}.x^{w}o^{55}.m^{j}a^{332}]	'condiment'

(a) Open syllables employ reduplication to form diminutive (subtraction does not apply) (Table 5. Ex 1-4);

(b) Closed syllables can make use of subtraction (rime change) (Table 5. Ex 5-8);

(c) Both subtraction and reduplication can be applied together, but subtraction is always obligatory when applicable (Table 5. Ex 9-14)

(d) There are very few cases where both the base and the reduplicant undergo subtraction (Table5. Ex 15-18)

(e) In a disyllabic or trisyllabic compound, only the ultimate syllable undergoes subtraction, if permissible (Table 5. Ex 19-22)

2.2 Diminutive tonal change

(1) X.Tian (1992) claims that there is 'diminutive tonal change'[小稱變調], which occurs in companion with reduplication:

- e.g. [ts^{h}a^{55}] → [ts^{h}a^{55}.ts^{h}a^{332}], 'pocket'

(2) J.Tian(2009) shows that the tonal change is a regular phonological phenomenon, not limited to diminutive formation:

- e.g.

a.	$[p^{h}\alpha\eta^{35}] \rightarrow [p^{h}\alpha\eta^{35}.pa^{55}]$, 'plate', diminutive formation
b.	$\backslash$t s$\alpha\eta^{35}\backslash.\backslash$t s^{h}$\ni\eta^{35}\backslash\rightarrow$ [t s$\alpha\eta^{35}$.t s^{h}$\ni\eta^{55}$], 'the Great Wall', compounding
c.	$[s^{w}a^{21}] \rightarrow [s^{w}a^{21}.s^{w}a^{332}]$, 'brush', diminutive formation
d.	$\backslash i^{21}\backslash.\backslash s\ni\eta^{21}\backslash\rightarrow [i^{21}.s\ni\eta^{332}]$, 'doctor', compounding

(3) However, Hou and Wen (1993) and J.Tian (2009) find that a few monosyllabic words do employ tonal change to form diminutive, but not productive:

Table 6. Diminutive tonal change

	Hou and Wen (1993:690)				J.Tian (2009:57)		
	noun	*diminutive*	*gloss*		*noun*	*diminutive*	*gloss*
a.	$[x^{w}a^{213}]$	$[x^{w}a^{411}]$	'flower'	e.	$[p^{q}o^{332}]$	$[p^{q}o^{51}]$	'surface'
b.	$[q\varepsilon^{213}]$	$[q\varepsilon^{411}]$	'month'	f.	$[t\c{c}i\eta^{332}]$	$[t\c{c}i^{51}]$	'well'
c.	$[p^{h}o^{213}]$	$[p^{h}o^{411}]$	'grandma'	g.	$[p\ni\eta^{332}]$	$[pu^{51}]$	'cost'
d.	$[ma^{33}]$	$[ma^{411}]$	'horse'				

(4) The diminutive tonal change is not reported as productive in either Hou and Wen (1993) or J.Tian (2009). Therefore, it will not be considered in the following analysis.

2.3 Summary of the patterns

For monosyllabic nouns:

(a) Open syllables form diminutive by full reduplication;

(b) Closed syllables from diminutive by subtraction (rime change);

(c) Closed syllables can be optionally reduplicated, but the second syllable in the reduplicated form still needs subtraction

For disyllabic/trisyllabic compounds:

(d) The ultimate syllable undergoes subtraction if permissible, but the available data are not informative enough to know whether reduplication can take place or not.

For tonal change:

(e) Very few words form diminutive by manipulating the lexical tone, so it can be viewed as lexical exceptions given the unproductivity.

3 Formalization

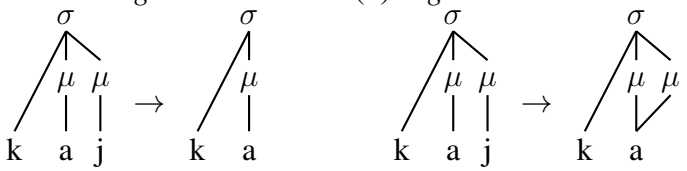
3.1 The moraic representation of subtraction (rime change)

(1) Both subtractive morphology (i.e. rime change) and morphological reduplication can be viewed as **Quantity Manipulating Morphology (QMM)**, since the phonological quantity is changed (augmented or reduced) under morphological conditions[2].

(2) Moraic Theory (Hayes 1989) is the most commonly used approach to represent quantity.

(3) There are **two** possible moraic representations of the subtracted (rime-changed) forms in Huozhou Chinese, i.e. **a) shortening**, or **b) segmental subtraction with compensatory lengthening (CL)**:

(a) *Shortening* (b) *Segmental subtraction with CL*



(4) I argue that the correct structure should be (3b) above, where only the segmental node is deleted but the mora is still there:

(a) According to the description of Shen et al. (2010), the subtracted forms tend to be lengthened (i.e. compensatory lengthening).

(b) The subtracted syllables still carry full tones. In Standard Mandarin, a full syllable with full tone is treated as bimoraic (e.g. Duanmu 2007), and it is reasonable to assume that Huozhou Chinese shares similar properties to Standard Mandarin.

3.2 The exponent of Huozhou diminutive morpheme

(1) 'Exponent' refers to the corresponding phonological material of a morphosyntactic structure (Matthews 1991) (e.g. The exponent of English morpheme PLURAL is /z/).

(2) The proposal of **Generalized Non-linear Affixation (GNA)** (Bermúdez-Otero 2012) makes a strong claim that all kinds of non-concatenative morphology can be derived by affixing non-linear phonological representations.

- Non-concatenative morphology: various morphological processes, such as morphological gemination, reduplication, metathesis, and subtraction, fall under the umbrella term 'non-concatenative morphology', since they do not employ sequential concatenation of the phonological materials affiliated with the morphemes.

(3) In line with GNA, many studies have have shown that various morphological processes can be analyzed as the affixation of certain prosodic templates, including

[2]Some other common types of QMM include morphologically triggered gemination, vowel lengthening, coda epenthesis, etc. (Trommer and Zimmermann 2014).

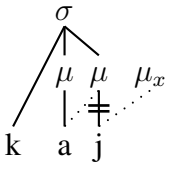
- morphological gemination and vowel lengthening (e.g. Davis and Ueda 2002)
- morphological metathesis (e.g. Bye and Svenonius, 2012)
- morphological reduplication (e.g. Saba Kirchner 2010, 2013, Bermúdez-Otero 2012, Bye and Svenonius 2012, Zimmermann 2013)
- subtractive morphology (Trommer and Zimmermann 2014)

(4) **Proposal**: the exponent of the diminutive morpheme in Huozhou Chinese is a mora, $\boldsymbol{\mu_x}$

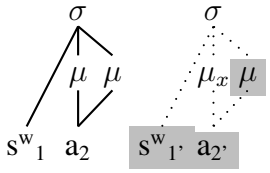
$$Diminutive : \mu_x$$

(5) When the stem is affixed by μ_x, either reduplication or subtraction can emerge as repair strategies to avoid a floating/drifting mora. The possible surface forms are given below (shaded elements and dotted lines are not underlying):

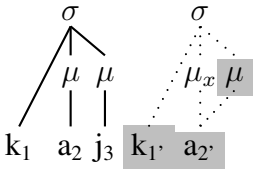
(a) *Subraction with CL*
[kaj]+μ_x → [ka]



(b) *Reduplication*
[s^{w}a]+μ_x → [s^{w}a.s^{w}a]



(c) *Partial reduplication*
[kaj]+μ_x → [kaj.ka]



(6) All these forms can be generated by the interaction of constrains.

4 Analysis in Optimality Theory

4.1 Crucial constraints

(1) Colored Containment Theory (van Oostendorp 2006)

(a) Underlying elements are colored; epenthetic elements are uncolored.

(b) Nothing can be 'deleted'. Instead, morphological materials can be marked as phonetically invisible.

(c) For instance:

(i) colored association line phonetically visible | *(ii) uncolored association line phonetically visible* | *(iii) colored association line phonetically invisible*

(2) Some crucial constraints that can derive subtraction are given below (Trommer and Zimmermann 2014):

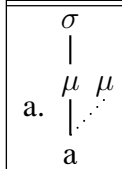
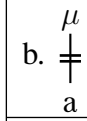
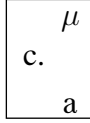
(a) $\mu \rightarrow \bullet$
Assign a violation mark to every mora node which does not dominate at least one segmental root node.

(b) $\mu \Rightarrow \bullet$
Assign a violation mark to every mora node which does not phonetically dominate at least one segmental root node.

(c) $\sigma \leftarrow \mu$
Assign a violation mark to every mora node which is not dominated by at least one syllable node.

(d) $*\bullet^{2\odot}$
Assign a violation mark to every segmental root node which is dominated by more than one root via phonetically visible material, where root is defined as a node not dominated by another node.

Violation profile:

	(a) $\mu \rightarrow \bullet$	(b) $\mu \Rightarrow \bullet$	(c) $\sigma \leftarrow \mu$	(d) $*\bullet^{2\odot}$
a. 			*	*
b. 		*		
c. 	*	*		

(3) Constraints that are relevant to reduplication:

(a) DEP-μ: Every mora of the output has a correspondent in the input (No mora insertion). (McCarthy and Prince 1995)

(b) INTEGRITY-IO: No segment of the input has multiple correspondents in the output (No fission). (McCarthy and Prince 1995, Struijke 2000)

(4) Another top-tier constraint is T/$\sigma_{\mu\mu}$, which motivates mora insertion:

- T/$\sigma_{\mu\mu}$
Lexical tone must be carried by a heavy syllable.

Note: This constraint is proposed on the basis of two principles,

- Weight-to-Stress Principle: A syllable is stressed iff it is heavy.
- Tone-to-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 2007, 2014)

4.2 The constraints in action

4.2.1 Open syllable noun: reduplication

- Recall the pattern shown in table 1 and table 5, subtraction (rime change) does not apply, and reduplication is employed to avoid floating/drifing mora μ_x.

Tableau 1. Reduplication as a repair strategy

		T/$\sigma_{\mu\mu}$	$\mu \rightarrow \bullet$	$*\bullet^{2\odot}$	$\sigma \leftarrow \mu$	INTEGRITY	DEP-μ
	σ μ μ $+\mu_x$ s^w a						
a.	σ μ μ μ_x s^w a		*!		*		
b.	σ μ μ μ_x s^w a	*!		*	*		
c. ☞	σ σ μ μ μ_x μ s^w_1 a_2 s^w_1, a_2,					**	*
d.	σ σ μ μ μ_x s^w_1 a_2 s^w_1, a_2,	*!				**	

4.2.2 Closed syllable noun: subtraction or partial reduplication

(1) Several candidates that fatally violate the top-tier constraints are not included in the following tableau to save space:

violates $\mu \rightarrow \bullet$: σ μ μ μ_x / k a j

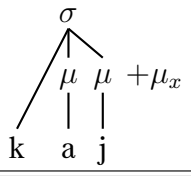
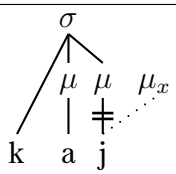
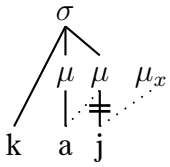
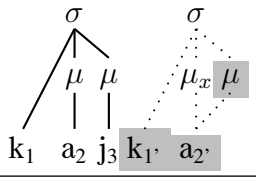
violates $*\bullet^{2\odot}$: σ μ μ μ_x / k a j

violates T/$\sigma_{\mu\mu}$: σ σ μ μ μ_x / k_1 a_2 j_3 k_1, a_2,

(2) In the following tableau, the constraints $\sigma \leftarrow \mu$ and INTEGRITY are unordered, which can yield variations (cf. Anttila 1997):

- When INTEGRITY $\gg \sigma \leftarrow \mu$, candidate (b) wins (tableau 2);
- When $\sigma \leftarrow \mu \gg$ INTEGRITY, candidate (c) wins (tableau 3).

Tableau 2. Subtraction as repair strategy

	T/$\sigma_{\mu\mu}$	$\mu \rightarrow \bullet$	$*\bullet^{2\odot}$	$\mu \Rightarrow \bullet$	INTEGRITY	$\sigma \leftarrow \mu$	DEP-μ
							
a. 				*!		*	
b. ☞ 						*	
c. 					*!*		*

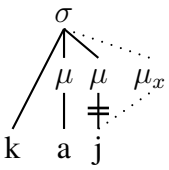
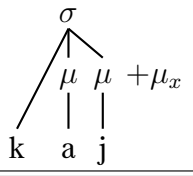
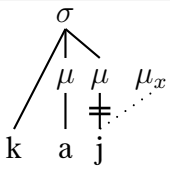
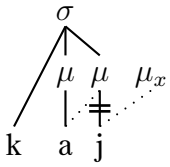
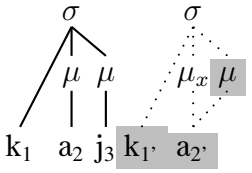
- Another candidate is 
- This candidate is not favored since the syllable node here dominates three moras.

Tableau 3. Partial reduplication as repair strategy

	T/$\sigma_{\mu\mu}$	$\mu \rightarrow \bullet$	$*\bullet^{2\odot}$	$\mu \Rightarrow \bullet$	$\sigma \leftarrow \mu$	INTEGRITY	DEP-μ
							
a. 				*!	*		
b. 					*!		
c. ☞ 						**	*

5 Alternative analysis

(1) Shen et al.(2010) view rime change as vowel harmony.

(2) The exponent of diminutive morpheme is analyzed as [zɭ], equivalent to the diminutive rhotic suffix [ɚɹ] in Standard Mandarin.

(3) Shen et al.(2010) propose two rules, i.e. vowel harmony rule and deletion rule, exemplified below ([pʰaŋ.zɭ]: 'plate + diminutive'):

Underlying	pʰaŋ.zɭ
Vowel Harmony	pʰɛŋ.zɭ
Deletion	pʰɛ∅-∅
Surface	pʰɛ

(4) This proposal is able to deal with the change of vowel quality during rime change, but there are several drawbacks comparing to the current analysis in this paper:

(a) The issue of learnability: there is no hint in adult's grammar showing that the exponent (underlying representation) is [zɭ];

(b) It cannot capture compensatory lengthening;

(c) It overlook reduplication as a way to form diminutive.

6 Closing remarks

To sum up, this paper

(1) demonstrates that all the patterns of Huozhou diminutive formation can be attributed to the affixation of a single mora;

(2) contributes new data to the theoretical literature of Generalized Non-linear Affixation;

(3) extends the typology of possible morphemes whose exponents consist of only one prosodic node.

(4) adds one more case to the typology of Chinese affixation (Lin 2004). Mora affixation can not only result in lengthening in Chinese languages, but also subtraction, as shown by Huozhou Chinese.

Next step:

(1) collect first-hand data on some detailed issues, including the diminutive formation of disyllabic/trisyllabic compounds;

(2) use acoustic evidence to confirm the moraic representation and refine the analysis.

References

Anttila, Arto. 1997. Deriving variation from grammar. In *Variation, Change and Phonological Theory*, ed. by Frans Hinskens, Roeland van Hout and Leo Wetzels, 35-68. Philadelphia: John Benjamins.

Bermúdez-Otero, Ricardo. 2012. The architecture of grammar and the division of labour in exponence. In *The Phonology and Morphology of Exponence*, ed. by Trommer, Jochen, 8-83. Oxford: Oxford University Press.

Bye, Patrik and Peter Svenonius. 2012. Non-concatenative morphology as epiphenomenon. In *The Phonology and Morphology of Exponence*, ed. by Trommer, Jochen, 427-495. Oxford: Oxford University Press.

Davis, Stuart and Isao Ueda. 2002. Mora augmentation processes in Japanese. *Journal of Japanese Linguistics* 18: 1-23.

Duanmu, San. 1990. A Formal Study of Syllable, Tone, Stress, and Domain in Chinese Languages. Doctoral dissertation, MIT, Cambridge, MA.

Duanmu, San. 2007. The phonology of standard Chinese (2nd edn). New York: Oxford University Press.

Duanmu, San. 2014. Syllable structure and stress. In *The Handbook of Chinese Linguistics*, ed. by C.-T. James Huang, Y.-H. Audrey Li, and Andrew Simpson, 422-442. Malden, MA: John Wiley & Sons.

Hayes, Bruce. 1989. Compensatory lengthening in moraic phonology. *Linguistic Inquiry* 20: 253-306.

Hou, Jingyi and Duanzheng Wen. 1993. The Handbook of Dialects in Shanxi Province [《山西方言調查研究報告》]. Taiyuan: Shanxi Gaoxiao Lianhe Press [山西高校聯合出版社].

Kirchner, Jesse Saba. 2010. Minimal Reduplication. Doctoral dissertation. University of California, Santa Cruz.

Kirchner, Jesse Saba. 2013. Minimal reduplication and reduplicative exponence. *Morphology* 23(2): 227-243.

Lin, Yen-Hwei. 1993. Degenerate affixes and templatic constraints: rime change in Chinese. *Language* 69(4): 649-682.

Lin, Yen-Hwei. 1997. A typology of Chinese affixation. *Chinese Languages and Linguistics, Vol 4: Typological Studies of Languages in China*, 405-424. Taipei: Institute of History and Philology, Academia Sinica.

Lin, Yen-Hwei. 2004. Chinese affixal phonology: Some analytical and theoretical issues. *Language and Linguistics* 5(4): 1019-1046.

McCarthy, John J. and Alan Prince. 1995. Faithfulness and reduplicative identity. In *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*, ed. by Jill N. Beckman, Laura Walsh Dickey and Suzanne Urbanczyk, 249-384. Amherst, MA: GLSA.

Shen, Ming. 2003. Diminutives in Shanxi dialects [山西方言的小稱]. *Fangyan* [《方言》]. 4: 335-351.

Shen, Ming., Liangzhen Feng, and Hiroomi Tsumura. 2010. The decline of vowel harmony in Huozhou dialect, Shanxi Province: the perspective of GIS [用GIS分析山西霍州方言元音諧和律的衰退現象]. *Journal of Chinese Linguistics* [《中國語言學報》] 14: 137-157.

Struijke, Caro. 2000. Existential Faithfulness: A Study of Reduplicative TETU, Feature Movement, and Dissimilation. New York: Routledge.

Tian, Juan. 2009. Phonology of Shanxi Huozhou Dialect [山西霍州方言語音研究]. Master's thesis. Xi'an: Shaanxi Normal University.

Tian, Xicheng. 1992. Diminutive rime change of Huozhou Dialect [霍州方言的小稱變韻]. *Journal of Shanxi University* [《山西大學學報》] 1: 1-8.

Trommer, Jochen and Eva Zimmermann. 2014. Generalized mora affixation and quantity-manipulating morphology. *Phonology* 31: 463-510.

van Oosdentorp, Marc. 2006. A Theory of Morphosyntactic Colours. Ms., Meertens Institute, Amsterdam. Available at [http://egg.auf.net/06/docs Hdt%20Oostendorp%20coulours.pdf]

Zimmermann, Eva. 2013. Non-concatenative allomorphy is generalized prosodic affixation: The case of Upriver Halkomelem. *Lingua* 134: 1-26.