A Constraint-Based Analysis of Chinese Fuzhou QieJiaoCi

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I.Introduction

Reduplication is an interesting topic in the area of the prosodic morphology, even in Optimality Theory (McCarthy & Prince 1995). In Chinese Fuzhou dialect, there are many kinds of reduplicated forms. For example. the total reduplication forms (A>AA) of a monosyllabic noun could be represented as the diminutives (Chen 1998). Partial reduplication forms (AB>ABB or AAB) of disyllabic adjectives in Fuzhou (Qu 1995) amplitude the degree of modification. Moreover, monosyllabic words could be augmented to disyllabic words by the processes composing of reduplication and insertions of fixed segments, e.g. Fuzhou Qiejiaoci (henceforth FQ), e.g. *tuoi>tuo luoi* 'holding hands'. In FQs the final coda segment of the first syllable is always truncated and the /l/ is always inserted as the onset. In this paper, reduplication, augmentation, truncation and fixed segmentism in FQs would be analyzed in Optimality Theory (henceforth OT). The important issue is that the language-specific syllabic template for reduplication is not needed. And the appearance of non-copied part is due to avoid the marked structure.

II.Fuzhou Phonology

2.1 Consonants

The Fuzhou consonantal system (Jan 1981,Chen & Zheng 1990, Chen 1998) listed in (1), Fuzhou has fifteen consonants.

(1)

p	p^h	m	
t	t^h	n	l
ts	ts^h		s
k	k^h	ŋ	x
ʔ			

Some important phonotactic rules are listed below:

(2a) Bilabial stops change to the labial fricative /β/ between two vocalics, while become to the labial stop /m/ when follow a nasal.

(2b) the apical consonants /t, ts, s/ change to the lateral /l/ between two vocalics, while become to the coronal nasal /n/ when follow a nasal.

(2c) / ts, ts^h ,s/ would be palatalized to /tɕ,$tɕ^h$,ɕ/ if they are followed by high front vocalics.

(2d) the velar consonants would be deleted between two vocalics, while become to the velar nasal /ŋ/ when follow a nasal.

2.2 Vowels

The basic vowels in Fuzhou are /a,e,œ,o,i,u,y/. /i,u,y/ could be the on-glide or the off-glide. Fuzhou vowels could be divided into two sets of the phonetic forms, the lax and the tense, depending on the tones they are associated with (Liang 1982, Qu 1995). The so-called tense

vowels co-occur with the tones, PingSheng, ShangSheng, YangRu while the lax forms with the ChiuSheng and YinRu. In case of undergoing tone sandhi, the lax vowel will change to its tense counterpart. Generally speaking, the major differences are: a tense vowel tends to higher (e.g. au> ou), or more fronted (e.g. ɑ >a), and the lower half of a lax diphthong is dropped, leaving behind a tense monophthong (ɛi>i) (Qu 1995). The lax/tense forms of the vowels are listed in (3) (Wang 1969:118)

(3) PingSheng, ShangSheng, YangRu — ChiuSheng, YinRu

i	ɛi
y	œy
u	ou
a	ɑ
œy	ɔy
ou	ɔu

2.3 Tones

Fuzhou has seven citation tones, traditionally called YinPing, YankPing, ShangSheng, YinChiu, YangChiu, YinRu, YangRu. According to the pitch value, the seven tones are represented as below in (4) (Liang 1982, Qu 1995, and many other)[1].

(4)

the tones	tonemes
YinPing (55)	HH
YangPing (53)	HL
ShangSheng (31)	Lor M
YinChiu (213)	LH
YangChiu (353)	LHL
YinRu (13)	LH
YangRu (5)	H

As mentioned above, in Fuzhou [-High] tonal domain the vowels must be the lax forms, while

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[1] Jang (2000) organizes the previous studies about the pitch values of Fuzhou tones.

	YinPing	YangPing	ShangSheng	YinChiu	YangChiu	YinRu	YangRu
Maccy&Baldwin	44	53	33	13	341	13	4
Tao1956	44	52	31	113	452	24	4
Yuan 1989	44	53	31	213	242	23	4
HanYu Fangyin 1989	44	52	31	213	342	23	4
Lan1953	55	61	33	11	242	13	56
Wang1969	55	51	33	113	242	24	45
Li & Liang1994	44	53	31	213	242	23	5
Liang&Feng 1996	44	53	32	212	242	23	5
Chen1998	55	53	33	213	242	24	5
Feng1998	55	53	33	212	242	24	5
Jang2000	55	51	31	11	353	13	5

the tense forms mostly are associated with the higher tones. In a disyllabic word domain the tones of the preceding syllable may undergo tone sandhi. The rules of tone sandhi in Fuzhou are complicated. Some of the rules concerned with the FQs would be listed in the next section, and the other will not be mentioned here.

III. Fuzhou Qiejiaoci (FQ) Formation

In Fuzhou many monosyllables are augmented into disyllabic words (Chen 1998). The meaning of FQs is almost identical to the original monosyllables. The formation of FQs is explained below.

(5a) tuoi>tuo *l*uoi 'holding hands

(5b) taŋ>t*a* laŋ 'sunshine'

(5c) tɑu>t*a* *l*ɑu 'hang'

(5d) mo?>m*o* *l*o? 'stick'

The data in (5) shown the source syllable is totally copied to form the FQs. The first derived syllable of FQs is alliterated with the source syllable and the second derived syllable is rhymed with the source syllable. The lateral */l/* segment is inserted as the onset of the second derived syllable of FQs. Comparing the two derived syllables of FQs the Final (rime) of the source syllable is reduplicated as the nucleus in the second derived syllable while the coda segments such as /i, u/ (vocalic codas), /ŋ/ (a nasal coda), /?/ (a glottal coda) in (5a-d) are truncated (Liang 1982).

The tone of the second derived syllable of FQs is identical to the source syllable. The tone of first syllable undergoes the two tone sandhi rules listed in (6):

	The source syllable		the first derived syllable
(6a)	PingSheng		
	ShangSheng	>	ShangSheng (31, a mid/low tone)
	YangRu		
(6b)	ChiuSheng		
	YinRu	>	ChiuSheng (11, low tone)[2]

Generally speaking the sandhi tones of the first syllable in FQs are the low ([-High]) tones, 31 tone, and 11 tone (Liang 1982). If the tone of the source syllable is high, as in (6a), the derived syllable would change to the lower tone. If the source syllable is with the low tone, the tone of the derived syllable would be more lower. As mentioned in (3) a syllable in Fuzhou with the ShangSheng and ChiuSheng has to be with the tense vowel form. Therefore the derived form with the sandhi tone would be with the tense vowel form.

The special character of FQs is to truncate the coda segment of the source syllable in derivation of FQs. That is, the CV/CGV syllabic structures are the only two possible types in the first syllable of FQs. In Fuzhou $C_1C_2VC_3C_4$ seems to be the largest template. However in

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[2] The sandhi tone (11) appears in the sandhi domain but not in the citation Fuzhou tones. Comparing with other tones it is very low so I use ChiuSheng to represent it.

Fuzhou syllables only two of the C_2, C_3 (C_2C_3 to be vocalic glides), C_4 (a nasal or a glottal stop) are allowed to appear in a syllable simultaneously. According to the constraint Liang (1982) lists the fourteen syllabic types in Fuzhou. No matter what the syllabic type is, the formation of the first syllable of FQs is to reduplicate form the onset to the nuclear vowel, but the coda would not be copied. The more data are listed in (7). This interesting phenomenon would be analyzed and explained in OT in the following sections.

(7a) CVGC	tuoi>tuo luoi	'holding hands (as in 5a)
(7b) CVN	taŋ>tɑ laŋ	'sunshine' (as in 5b)
(7c) CVC	mo?>m*o* lo?	'stick' (as in 5d)
(7d) CVG	tɑu>tɑ lɑu	'hang' (as in 5c)
(7e) CV	pœ>pœ lœ	'kick with strength'
(7f) VGC	ou?>o/u lou?	'fold'
(7g) VG	au> a lau	'indented'
(7h) VC	œ?> œ lœ?	'sound of vomit'
(7i) V	o>o lo	'stick'
(7j) CGVC	sia?>sia lia?	'slim'
(7k) CGVG	pieu> pie lieu	'spring out'
(7l) CGV	tie> tie lie	'drop down'
(7m) GVC	kuoŋ>kuo luoŋ	'roll up'
(7n) GVG	uai> ua lai	'slope'
(7o) GV	uo>uo luo	'getting together'

IV. An OT analysis

4.1 Optimality Theory and Reduplication

Reduplication has been attracted a lot of attention in phonological theory and OT. Many languages seem to have more than one pattern of reduplication, e.g. total or partial reduplication, augmentation or truncation. Reduplication is a kind of morphological word formation where a phonological string with morphological information is repeated. Many kinds of reduplication data have shown that the whole source is copied (total reduplication) with /out phonological change, while some part of the source is copied or disappear or something new appears. Steriade (1988) proposes the derivation is not haphazard, but to avoid marked structures. That is, the many kinds of the surface reduplicating forms derive from a single linguistic system. This idea, ***the emergence of the unmarked*** (henceforth TETU), also has been given by McCarthy & Prince (1994, Spaelti 1997).

In previous studies of reduplication, a template has been postulated onto which segments from the base are mapped. A typical approach of partial reduplication suggests that this is the result of templates proposed by McCarthy (1979), Marantz (1982), McCarthy & Prince (1986) and many others. However such templates have no status in imposing the proper size restriction on the morphological constituent. And the determination of which part to be the reduplicant or

the base is s tricky, and sometimes arbitrary. In a language a kind of pattern is made on morphological (or morph-syntactic) grounds while the other may be on phonological or lexicalized grounds. The several types seem to be mutually exclusive. It is argues that they could be combined in a single system implemented in OT. Here it is argued that partial reduplication, e.g. the coda-truncation in FQs is to avoid marked structures. And it is argued that no special reduplication-specific devices are required.

In OT framework reduplication is explained that an abstract RED is copied from the base in accordance with constraints which are universal and violable. Therefore the different phenomena of reduplication among languages are due to the ranking of the relevant constraints. The deviation between the base and the reduplicant is often found. This is the result of markedness pressure. Whether the pressures affect the reduplicnat is due to constraint ranking. M&P (1994) show that TETU account of partial reduplication is possible. If a reduplicative system copies everything in the base that is not marked, the result will be a variety of different forms of truncation of the reduplicant. In total reduplication every segment in ROOT or BASE is required to be parsed in Reduplicant to avoid the violation of the high copying constraint. However some constraint concerning with the TETU is higher than the total copying constraint some part would be deleted or truncated. The ranking of constraints for the FQs is argued as : the $TETU_{CON}$>>$COPY_{CON}$.

4.2 An OT analysis of FQs

The Optimality Theory claims that there is a linguistic mechanism, called GEN(ERATOR), which can produce indefinite Outputs in case of Input in it. The optimal selected output is called the optimal candidate. It is selected according to the ranking of the relevant constraints. The optimal candidate compels others by minimal violations of higher constraints. For FQs the relevant constraints are discussed below.

In OT, reduplication is explained that there is an abstract RED to represent the reduplicants. The phonological materials RED are copied from Input. The model for the analysis of reduplication implemented in OT is listed in (8a) (M&P 1995). The model shows that the IO relationship is the Stem-Base relationship. While the identity between RED and Base is the Output-Output comparing relationship. The ranking of the faithfulness constraints shows the interactions of the domains.

(8a) Full Model

Input: /$Affix_{RED}$ + Stem/

↗ ↙ ↑ ↓ ***I-O Faithfulness***

Output: RED ⇄ Base

B-R Identity

(8b) FAITH-IB : every element in Input must have a correspondence in Base.

(8c) FAITH-BR : every element in Base must have a correspondence in RED.

(8d) FAITH-IR : every element in Input must have a correspondence in RED.

The constraint (8b) requires GEN to produce Output where every element has its correspondence in Input and no deletion or insertion is allowed. In FQs the monosyllable is augmented to disyllabic words. The coda segment in the source syllable is not parsed in Base; that is, there would be violations of FAITH-IB. FQs are formed by total reduplication so FAITH-BR should be violated and not ranked very high. The phonological materials of the rime in RED are totally copied from Input. Although the /l/ segment has to replace the original onset, the onset element has the correspondence in Base, so there is no violation. Th ranking of the three constraints is : FAITH-IR>> FAITH-IB>> FAITH-BR

Tableua 9

Input: tɑu 'hang' , RED Output: tɑ lɑu 'hang'

Ranking: FAITH-IR >>FAITH-IB>> FAITH-BR

tɑu, RED	FAITH-IR	FAITH-IB	FAITH-BR
9a.tɑu lu	*!		*
☞9b.tɑ lɑu		*(u)	*
9c.tɑu lɑ	*!		*

In Tableau 9 the black line indicates the constraints are crucially ranked. The candidates (9a) and (9c) delete a segment /ɑ/, /u/ respectively, therefore they have a fatal violation (* indicated as a violation and *! indicated as violated fatally) of the higher constraint, FAITH-IR. In the candidate (9b), /u/ in Input do not have their correspondences in Base[3]but it violates a lower constraint so is selected as the optimal candidate (as the symbol ☞ indicated).

(10a) ANCHORL-BR: the initial element in RED must correspond to the initial element in Base.

(10b) CONTIGUITY-BR(no skipping): adjacent elements in RED are required to correspond to adjacent elements in Base.

(10c) LINEARITY-BR (no reversion or mutation): the linear order of elements in R is identical to the linear order of their corresponding elements in B.

In FQs the elements are copied from the left edge contiguously according to the linear order of the source syllable. The three constraints (M&P 1995) require the initial element in RED to correspond to the initial element in Base, and no skipping or reversion is allowed. The different rankings of the three constraints can explain the different kinds of reduplication, e.g. prefixation, suffixation, among languages. In FQs the three constraints are not crucially ranked. Tableau 11 shows the analysis.

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[3] In this stage there would be another candidate, *tɑu lɑu*. The coda is not allowed to appear in FQs. Thus this candidate would be fatal for some other higher constraint. The problem would be discussed more in the following paragraphs.

Tableau 11

Input: tuoi, RED Output: tuo luoi 'holding hands (as in 5a,7a)

Ranking: ANL-BR, CONT-BR, LIN-BR

Tuoi, RED	ANL-BR	CONT-BR	LIN-BR
11a. uo loi	*		
☞ 11b. tuo luoi			
11c. to lou		* (tuo:to)	
11d. tuoi liuo			* (uoi:iuo)

Th initial /t/ in Base does not have its correspondence in the candidate (11a). The candidate (11c) violates the constraint CONT-BR for there is a skipping of /u/. The linear order of the segments in Base is not respected, so there is a violation in the candidate (11d). (11b) does not have ant violation so is selected as the optimal candidate.

As mentioned above, the segment /l/ always appears as the onset in the second syllable of FQs. If there is a consonantal initial onset in Input, /l/ would replace it in RED, as shown in (7a-7e, 7j-7m). While not, /l/ would be inserted, as in (7f-7i, 7n-7o). Therefore there is a constraint (in 12a) which requires every syllable must have an onset.

(12a) ONSET: every syllable must have an onset.

Among languages the reduplication data show the incomplete copying with various segments (or tones or features) in Input replaced by fixed segments. For example, Yoruba nominalizations, the reduplicative morpheme has the fixed vowel *i* (Alderete et al 1999). In Chinese reduplicative data, /l/ is found as the fixed segment in onsets. Yip (2000) argues that the fixed segmental replacement is an instance of TETU; that is, the appearance of /l/ is to avoid the marked structure. Yip (2000) proposes that the choice of /l/ results from the markedness hierarchy (Prince & Smolensky 1993), listed in (11b).

(12b) * Labial >> * Dorsal >> * Coronal

The hierarchy means that to parse the labials or the dorsals is less harmonious than the coronals. The coronals are the unmarked segments among languages. In Fuzhou the consonant /l/ is a coronal lateral and is analyzed as the variance of /n/ (Chen 1998:7). The preference of /l/ over /t/ is attributed to the avoidance of the markedness structure. It is usually found among languages that the segment between two sonorants would be voiced. Therefore the constraint listed in (12c) prohibits a voiceless segment between two sonorants.

(12c) INTERSONORANT VOICING : * [+ son] [-vcd] [+son]

As mentioned above in Fuzhou the stops would change to voiced fricatives between two sonorants (in 2a) and the apical coronals /t, ts, s/ change to the lateral /l/ between two vocalics (in 2b). The phonotactic rules are given the evidence of the constraint. Therefore the choice of /l/ would be attributed to intersonorant voicing since the onset in the second syllable of FQs always be between two vowels. In a sum the ranking of the constraints for the fixed segmentism of /l/ in FQs is : * Labial, Dorsal >> ONSET >> * INTERVED >>* Coronal. An example is given in Tableau 13.

Tableau 13

Input : pœ, RED Output: pœ lœ 'kick with strength' (as 7e)

Ranking : * Labial, Dorsal >> ONSET >> * INTERVCD >>* Coronal

pœ, RED	* Labial, Dorsal	ONSET	* INTERVED	* Coronal
13a.pœ pœ	*!		*	*
13b.pœ tœ			*!	*
☞13c.pœ lœ				*
13d.pœ œ		*!		

The candidate (13a) has copied the labial voiceless stop as the onset so it violates the undominated constraint. ONSET rules out the candidate (13d) with an onsetless syllable in RED. The coronal /t/ in (13d) is voiceless between two vowels so it is fatal. The candidate (13c) with the unmarked segment /l/ is selected as the optimal candidate.

Another interesting phenomenon of FQs is the truncation of the coda in RED. The incomplete copying is also attributed to the avoidance of marked structure. It is argued that the markedness constraints outrank the faithfulness constraints. Yip (2000) argues that cross-linguistically codas are marked. The CV structure is made by the truncation of the coda in FQs. The CV structure is the unmarked structure cross-linguistically. Thus the constraint NOCODA (in 14a) which is the markedness constraint can capture the fact.

(14a) NOCODA: every syllable must have a coda.

In FQs the first syllable has no coda while the second syllable copies the whole rime. The ranking of the markedness constraint and the faithfulness constraints is in (14b) and an example is given in Tableau 15.

(14b) FAITH-IR >> NOCODA >> FAITH-IB>> FAITH-BR

Tableau 15

Input : taŋ, RED Output: tɑ lɑŋ 'sunshine' (as in 5b, 7b)

taŋ, RED	FAITH-IR	NOCODA	FAITH-IB	FAITH-BR
15a.tɑ la	*!		*	*
15b.tɑŋ lɑŋ		**!	*	*
15c.tɑŋ la	*!	*	*	*
☞15d.tɑ lɑŋ		*	*	*

The two candidates (15a) (15c) are fatal since the coda in Input does not has its correspondence in RED. (15b) has more violations than the optimal candidate (15d) for it has two codas in that word. The phonetic form of the vowel has to change because of the tone sandhi. This part is not discussed here. Generally speaking, the ranking of the constraint, NOCODA, is not so high since Fuzhou syllables have different kinds of codas such as vocalic glides, the velar nasal or the glottal stop. However the ranking changes to avoid the marked structure.

V. Conclusions

In this paper the formation of Fuzhou Qiejiaoci is analyzed in OT framework. A monosyllable is reduplicated and augmented into a disyllabic word. Incomplete copying shown by two points; the truncation of the coda and the insertion of the fixed segment /l/. However the partial

reduplication is argued to avoid the marked structure. In OT the total reduplication is due to the effects of the faithfulness constraints. FQs are not formed by total reduplication so the B-R identity is not relevant. The coda-truncation and the fixed segment insertion form the unmarked structures, e.g. CV structure. This is done by the higher markedness constraints. The ranking of relevant constraints listed above is organized below:

(16)

ANL-BR,

CONT-BR, >>* Lab >> ONSET >> INSONVCD >>* Coronal >> F-IR >> NOCODA >> F-IB>> F-BR

LIN-BR *Dor

References

Alderete, John, Jill Beckman, Laura Benua, Amalia Gnandesikan, John McCarthy & Suzanne Urbancyzk. 1999. Reduplication and segmental unmarkedness. *Linguistic Inquiry*, 30:327-364.

Chen, Yachuan and Yide Zheng. 1990. Fuzhouhua Xingrongci Chongdieshi de Yinbian Fangshi Jiqi Leixing [Sound and their types in Fuzhou adjective reduplication], *Zhongguo Yuwen*, 5:362-370.

Chen, TzePing. 1998. Fuzhou Fangyan Yanchiou. Fuzhou: Fujian Renmin Chubanshe. (陳澤平。1998。福州方言研究。福州：福建人民出版社。)

Feng, Aijen. 1998. Fuzhou Fangyan Tsidian. Nanjing: Jiangsu Chiaoyu Chubanshe. (馮愛珍。1998。福州方言詞典。南京：江蘇教育出版社。)

Hanyu Fangyan TziHuei. 1989. Beijing University Jungkuo Yuwen Shiueshi Yuyanshiue Jiaoshi. Beijing: Wentzi Gaige Chubanshe. (漢語方音字匯。1989。北京大學中國語文學系語言學教研室。北京：文字改革出版社。)

Jan, PoHuei.1981. Xiandai Hanyu Fangyan. Hebei Renmin Chubanshe.(詹伯慧。1981。現代漢語方言。河北人民出版社。)

Jang, PingSheng. 2000. Luen FuzhouHua PinYinTsiDian jungdeFuzhouHua Yinshi. In the proceddings on 18th Chinese Phonology Conference. FuJen Catholic University. Taiwan. (張屏生 2000 論福州話拼音字典中的福州話音系。第十八屆中國聲韻學學術研討會論文。台灣輔仁大學。)

Lan, Shiouia. 1953. Fuzhou phonology. Wenshijr Shiuebao. Taiwan University. Taiwan. (藍秀亞 1953 福州音系。台灣大學文史哲學報, 6:241-331。台灣大學。中華民國台北。)

Li, Rulung, Liang Yujang, Tzou Guangtsuen, Chen Tzeping. 1994. Fuzhou Fangyan Tsidian. Fuzhou: Fujian Renmin Chubanshe. (李如龍、梁玉璋、鄒光椿、陳澤平。1994。福州方言詞典。福州：福建人民出版社。)

Liang, Yujang & Feng Aijen. 1996. The phonological profile of Fuzou. Shanghai: Shanghai Jiaoyu Chubanshe. (梁玉璋、馮愛珍。1996。福州話音檔。上海：上海教育出版社。)

Liang, Yujang. 1982. The Qiejiaoci in Fuzhou dialect. *Fangyan*, 1:37-46.

Maccy, R.C. & C.C. Baldwin. 1929. Alphabetic dictionary of the Foochow dialect. (福州話拼音

字典) The third version. The Presbyterian Mission Press. Shanghai.

Marantz, Alec. 1982. Re Reduplication. *Linguistic Inquiry*, 13:435-482.

McCarthy, John J. 1979. Formal problem in Semitic phonology and morphology. PhD dissertation in MIT.

McCarthy, John J. & Alan S. Prince. 1986. Prosodic morphology. ms, University of Massachusetts and Brandeis University.

McCarthy, John J & Alan S. Prince. 1995. Faithfulness and reduplicative identity. In University of Massachusetts Occasional Papers in Linguistics (UMOP) 18: papers in optimality theory. (eds.) by J. Beckman, L. Walsh Dickey and S. Urbancyzk. GLSA, Umass, Amherst. 249-384.

McCarthy, John J & Alan S. Prince. 1994. The emergence of unmarked: optimality in prosodic morphology. *NELS* 24.

Prince, Alan S. & Paul Smolensky. 1993. Optimality theory : constraint interaction in generative grammar. ms. (to appear)

Qu, Yanfeng. 1995. Adjective reduplications in Fuzhou: a morpho-phonological analysis. *Journal of East Asian Linguistics*, 4:1-27.

Spaelti, Philip. 1997. Dimensions of variation in multi-pattern reduplication. PhD dissertation, University of California at Santa Cruz.

Steriade, Donca. 1988. Reduplication and syllable transfer in Sanskrit and elsewhere. *Phonology*, 5: 73-155.

Tao, Yumin. 1956. Minyu Ianhiao. Beijing: Keshiue Chubanshe. (陶燠民 1956 閩語研究。北京：科學出版社。)

Wang, Tien-Chang. 1969. Phonetic research on the Foochow dialect. The Sun Yat-Sen Cultural Foundation, Taiwan, ROC. (王天昌 1969 福州語音研究 中華民國中山學術文化基金會董事會補助。台灣世界書局。)

Yip. Moira. 2000. Segmental unmarkedness versus input preservation in reduplication. To appear in Segmental Phonology in Optimality Theory (ed.) by L. Lombardi. Cambridge University Press.

Yuan Chiahua. 1989. Hanyu Fangyan Gaiiao. Beijing: Wentzi Gaige Chubanshe. (袁家驊。1989。漢語方言概要。北京：文字改革出版社。)

Zheng, Yide. 1990. Fuzhou Fangyan Xingrongci Chongdieshi [Adjective reduplication in Fuzhou]. *Fangyan*, 4:301-311.