Vowels

nasal /n/ when follow a nasal.

(1b) the initial consonant would be deleted between two vowels, while become to the velar.

(1c) /s/ would be palatalized to /ʃ/ if they are followed by high front vowels.

(2a) labial stop /w/ when follow a nasal.

(2b) Bilabial stops change to the labial ridge /j/ between two vowels, while become to the

are important phonological rules are listed below:

\[
\begin{array}{ccccccc}
\text{x} & \text{ŋ} & \text{s} & \text{ʃ} & \text{k} & \text{l} & \text{t} \\
\text{m} & \text{p} & \text{d} & \text{n} & \text{t} & \text{g} & \text{g}
\end{array}
\]

Introduction

Wu, Channing

A Constraint-Based Analysis of Chinese Putonghua Dialects
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. a >a), and the lower half of a lax diphthong is dropped, leaving behind a tense monophthong (ei>i) (Qu 1995). The lax/tense forms of the vowels are listed in (3) (Wang 1969:118)

<table>
<thead>
<tr>
<th>(3) PingSheng, ShangSheng,</th>
<th>ChiuSheng, YinRu</th>
</tr>
</thead>
<tbody>
<tr>
<td>YangRu</td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>ei</td>
</tr>
<tr>
<td>y</td>
<td>øy</td>
</tr>
<tr>
<td>u</td>
<td>ou</td>
</tr>
<tr>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>øy</td>
<td>øy</td>
</tr>
<tr>
<td>ou</td>
<td>ou</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>(4) the tones</th>
<th>tonemes</th>
</tr>
</thead>
<tbody>
<tr>
<td>YinPing (55)</td>
<td>HH</td>
</tr>
<tr>
<td>YangPing (53)</td>
<td>HL</td>
</tr>
<tr>
<td>ShangSheng (31)</td>
<td>L or M</td>
</tr>
<tr>
<td>YinChiu (213 )</td>
<td>LH</td>
</tr>
<tr>
<td>YangChiu (353)</td>
<td>LHL</td>
</tr>
<tr>
<td>YinRu (13)</td>
<td>LH</td>
</tr>
<tr>
<td>YangRu (5)</td>
<td>H</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th></th>
<th>YinPing</th>
<th>YangPing</th>
<th>ShangSheng</th>
<th>YinChiu</th>
<th>YangChiu</th>
<th>YinRu</th>
<th>YangRu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maccy&amp;Baldwin</td>
<td>44</td>
<td>53</td>
<td>33</td>
<td>13</td>
<td>341</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Tao1956</td>
<td>44</td>
<td>52</td>
<td>31</td>
<td>113</td>
<td>452</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>Yuan1989</td>
<td>44</td>
<td>53</td>
<td>31</td>
<td>213</td>
<td>242</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td>HanYu Fangyin 1989</td>
<td>44</td>
<td>52</td>
<td>31</td>
<td>213</td>
<td>342</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td>Lan1953</td>
<td>55</td>
<td>61</td>
<td>33</td>
<td>11</td>
<td>242</td>
<td>24</td>
<td>45</td>
</tr>
<tr>
<td>Wang1969</td>
<td>55</td>
<td>51</td>
<td>33</td>
<td>113</td>
<td>242</td>
<td>24</td>
<td>45</td>
</tr>
<tr>
<td>Li &amp; Liang1994</td>
<td>44</td>
<td>53</td>
<td>31</td>
<td>213</td>
<td>242</td>
<td>23</td>
<td>5</td>
</tr>
<tr>
<td>Liang&amp;Feng1996</td>
<td>44</td>
<td>53</td>
<td>32</td>
<td>212</td>
<td>242</td>
<td>23</td>
<td>5</td>
</tr>
<tr>
<td>Chen1998</td>
<td>55</td>
<td>53</td>
<td>33</td>
<td>213</td>
<td>242</td>
<td>24</td>
<td>5</td>
</tr>
<tr>
<td>Feng1998</td>
<td>55</td>
<td>53</td>
<td>33</td>
<td>212</td>
<td>242</td>
<td>24</td>
<td>5</td>
</tr>
<tr>
<td>Jang2000</td>
<td>55</td>
<td>51</td>
<td>31</td>
<td>11</td>
<td>353</td>
<td>13</td>
<td>5</td>
</tr>
</tbody>
</table>
The sanzhiu tone (11) appears in the sandhi domain but not in the citation phoneme tones.

In Puzhoun, the syllable /CVC/ accounts for the largest template. However, there are only two possible tones in the citation phoneme domain, the /CVC/ syllable being in the derived form. The source syllable would be more prominent, and the derived form would give rise to the derived form. Therefore, the derived form.

The derived syllable would be more prominent. As mentioned in (3), a syllable in Puzhoun with the last syllable would become more prominent. If the source syllable is with the lowest tone, the tone of the derived syllable is higher, as in (6a), the derived syllable.

The tone of the derived syllable of Puzhoun is slightly raised, with the source syllable and the second syllable being the same.

The derivate (5) shows the source syllable is usually copied to form the derived syllable.

Puzhoun is almost identical to the original monosyllables. The formation of Puzhoun is explained.

It is possible to refer to these forms mostly are associated with the higher tones in a derived domain. The rules of tone sandhi in Puzhoun are.

The rules of tone sandhi in Puzhoun are.

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The rules of tone sandhi in Puzhoun are.
Fuzhou syllables only two of the C₂, C₃ (C₂C₃ to be vocalic glides), C₄ (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 tuo>i tuo luoi ‘holding hands (as in 5a)
(7b) CVN tan>ta laŋ ‘sunshine’ (as in 5b)
(7c) CVC mo?>mo lo? ‘stick’ (as in 5d)
(7d) CVG tau>ta lau ‘hang’ (as in 5c)
(7e) CV poe>poe 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 kuon>kuo luon ‘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