Chapter 2
Phonology and morphophonology

2.1 The phonemes

This chapter will mainly deal with the phonology of the Wanci dialect of the Tukang Besi language, but will also include an account of the more salient features of the phonology of the other dialects, such as gemination and the retroflex lateral phone. This information is presented in a descriptive manner, with phonemic contrasts amongst consonants being exemplified in detail only where the two phonetic distinct sounds are close enough to suspect a phonemic identity. The allophones of the individual phonemes are presented with the description of the phonemes, and further attention will be paid to those phonemes or groups of phonemes that show problematic allophony. The phoneme inventory of the Wanci dialect consists of maximally twenty seven consonants (counting loan phonemes) and five vowels (though see the historical analysis presented in chapter 1.3, which involves the use of a sixth vowel, /u/ (contrasting with /m/ to account for the correspondences across dialects). The consonants and vowels are dealt with and exemplified separately in section 2.1.1 and 2.1.2.

2.1.1 Phoneme inventory

Consonantal phonemes:

<table>
<thead>
<tr>
<th>Place:</th>
<th>Manner:</th>
<th>Bilabial</th>
<th>Alveo-Dental</th>
<th>Palatal</th>
<th>Velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plosive, voiceless</td>
<td></td>
<td>p</td>
<td>t̚</td>
<td>(t̚j)</td>
<td>k</td>
<td>ʔ</td>
</tr>
<tr>
<td>Plosive, voiced</td>
<td>(b)</td>
<td>d</td>
<td>(d̚)</td>
<td>(d̚j)</td>
<td>g</td>
<td></td>
</tr>
<tr>
<td>Implosive</td>
<td>ɓ</td>
<td>Ø</td>
<td></td>
<td></td>
<td></td>
<td>h</td>
</tr>
<tr>
<td>Fricative</td>
<td>θ</td>
<td>s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal</td>
<td>m</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenasalised, voiceless</td>
<td>m̥</td>
<td>n̥</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prenasalised, voiced</td>
<td>m̊b</td>
<td>n̊d</td>
<td>(n̊d̚j)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sonorant</td>
<td>r</td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: forms () in brackets are loan phonemes (mainly from Indonesian/Trade Malay), with [t̚j] alternating with [s], and [d̚] with [d̚j] (and sometimes [z] as well).
Vowel phonemes:

<table>
<thead>
<tr>
<th></th>
<th>FRONT</th>
<th>BACK</th>
<th>ROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>i</td>
<td>w</td>
<td>ɔ</td>
</tr>
<tr>
<td></td>
<td>ɛ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOW</td>
<td></td>
<td>a</td>
<td></td>
</tr>
</tbody>
</table>

2.1.2 Description of the phonemes

Here I list the phonemes and their major allophonic variants, with examples of the phonemes in words.

/p/ Voiceless bilabial stop
→ [ᵢ], [ᵢ̃] /__(a, o)
→ [p]
porai [pɔrai] ‘fiancée’
kape [kape] ‘hand drum’

/mp/ prenasalised voiceless bilabial stop
→ [ᵢ̃p], [ᵢ̃p̃] /__(a, o)
→ [mp]
mpa’ampa’a [mp̃a’ampa’a] ‘starfish’
katumpu [kɑ’atumpu] ‘house post’

Note that /p/ and /mp/ have identical allophonic distributions, the only difference being the prenasalisation associated with /mp/.

/b/ imploded bilabial stop
→ [ɓ], [ᵢ̃], (voiced or voiceless imploded stop)
→ [ɓ̃], [ɓ̃] /_V#
→ [ɓ̃] /_V
bambai [ɓɑmbai] ‘comb’
soba [soˈba] ~ [soˈba] ‘try’

/mb/ prenasalised voiced bilabial stop
→ [mb], [m̃b] /free variation
→ [m̃b] /fast speech (see section 2.1.7)
mbale [m̃bale] ‘lie down’
wombo [w̃ombo] ‘2nd story in a house’

/m/ voiced bilabial nasal stop
→ [m]
mura [mᵢrə] ‘probably’
amja [amja] ‘father’
/β/  voiced bilabial fricative
→  [β], [v]  /free variation
→  [β]  /rare allophone (found more commonly in children’s speech)
   /dominant allophone in Tomea and Binongko

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>worai</td>
<td>[βoɾai] ~ [vɔɾai] ~ [βɔɾai]</td>
<td>‘sarong’</td>
</tr>
<tr>
<td>’awa</td>
<td>[βaɾa] ~ [vɔɾa] ~ [βaɾa]</td>
<td>‘get’</td>
</tr>
</tbody>
</table>

The fact that [β] is the major allophone of /β/ in Southern Tukang Besi means that the contrast between /β/ and /p/ is often reduced in those dialects, as it often is in Northern Tukang Besi as well. The [β] allophone of /β/ overlaps with the [β] allophone of /h/, and the [β] allophone overlaps with the [β] allophone of /b/, reducing the contrast between phonemes in two other contexts as well.

/b/  voiced bilabial stop
Loan phoneme only present in recent borrowings
→  [b]

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>baiara</td>
<td>[bajara]</td>
<td>‘pay’</td>
</tr>
<tr>
<td>babi</td>
<td>[baɓi]</td>
<td>‘pig’</td>
</tr>
</tbody>
</table>

/a/  voiceless apico-dental stop
→  [a]

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tinti</td>
<td>[tʰiŋi]</td>
<td>‘run’</td>
</tr>
<tr>
<td>oto</td>
<td>[oŋo]</td>
<td>‘car’</td>
</tr>
</tbody>
</table>

/ŋ/  prenasalised voiceless apico-dental stop
→  [ŋ]

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>nti’i</td>
<td>[nti’i]</td>
<td>‘fast’</td>
</tr>
<tr>
<td>tanta</td>
<td>[tanda]</td>
<td>‘aunt’</td>
</tr>
</tbody>
</table>

/ŋ/  voiced imploded apico-dental stop
→  [ŋ]
→  [ŋtʃ], [ŋʃ]  /V#

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>dapi</td>
<td>[ŋapist]</td>
<td>‘twin’</td>
</tr>
<tr>
<td>hada</td>
<td>[ŋadə]</td>
<td>‘shall, will, want’</td>
</tr>
</tbody>
</table>

/ŋ/  prenasalised voiced apico-dental stop; idiolectally released rhotically (especially in Kaledupa dialect)
→  [ŋ], [ŋg]
→  [ŋʃ]
→  [ŋŋ]  /fast speech (see section 2.1.7)

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ndanga</td>
<td>[ŋanda]</td>
<td>‘jackfruit’</td>
</tr>
<tr>
<td>wande</td>
<td>[ŋanda] ~ [ŋandə] ~ [ŋanda]</td>
<td>‘rain’</td>
</tr>
</tbody>
</table>

/p/  voiced apico-dental nasal stop
→  [p]

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>nangu</td>
<td>[ŋanu]</td>
<td>‘swim’</td>
</tr>
<tr>
<td>pana</td>
<td>[paŋa]</td>
<td>‘arrow’</td>
</tr>
</tbody>
</table>
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/s/ grooved voiceless alveolar fricative
→ \[s\]
sala \[sala\] ‘road’
mobasa \[mobasa\] ‘large’

/p\s/ prenasalised voiceless grooved alveolar fricative
→ \[^p\s\], \[^s\] (see section 2.1.7)
hansu \[^hansu\] ~ \[^h\is\is\] ‘sword’

/d/ voiced apico-alveolar stop/voiced palato-alveolar stop
Loan phoneme only present in borrowings
→ \[d\] dominant allophone in Mandati-Lia sub-dialects of Wanci, and Tomea-Binongko; idiolectally otherwise
→ \[d\is\] da’o, ja’o \[^da\is\o\] ~ \[^dz\is\o\] ‘bad, evil’
karadaa, karajaa \[^kar\is\ar\] ~ \[^kar\is\aj\] ‘work’

/l/ tapped or trilled voiced alveolar rhotic
→ \[r\]
→ \[^r\] /V__V Wanci dialect only
→ \[^l\] /V__V casual fast speech (Wanci dialect only)
ramo \[^ramo\] ‘flesh’
bara \[^ba\is\a\] ‘don’t’

/e/ voiced alveolar lateral
→ \[l\]
→ \[^l\] /V__V casual fast speech (Wanci dialect only)
→ \[^l\] /(a.o.u)__ Tomea, Binongko dialects
laro \[^lo\is\o\] ‘inside’
ido \[^lo\is\o\] ‘fly’

Note that a common allophone of both /l/ and /r/ is \[^l\] or \[^r\]; this means that the contrast between the two phonemes is often neutralised, as in the examples above.

/s\’/ voiceless (palato-) alveolar sibilant; in free variation with /s/
Loan phoneme only present in borrowings
→ \[^s\’\], \[^s\] cokolati, sokolati \[^sokolati\] ‘brown; chocolate’

/d\s/ voiced apico-alveolar stop or fricative/voiced palato-alveolar stop
Loan phoneme only present in borrowings; often varies with /d/
→ \[^d\], \[^d\is\] da’o, ja’o \[^da\is\o\] ~ \[^dz\is\o\] ~ \[^da\is\o\] ‘bad, evil’
karadaa, karajaa \[^kar\is\ar\] ~ \[^kar\is\aj\] ‘work’
Prenasalised voiced apico-alveolar stop or affricate

Suspected loan phoneme only present in very few observed forms

→ \[d\], \[\dd\]

makanjara [maka'ndʒara] ~ [maka'ndara] ‘kind of dance’

/k/ voiceless dorso-velar stop

→ \[k\], \[c\] /\_i

→ \[k\]

kie [kie] ~ [cie] ‘mat’
aka [aka] ~ [akra] ‘root’

\[k\]/ prenasalised voiceless dorso-velar stop

→ \[n\]

ngkaru [ŋkaru] ‘carry’
pangku [paŋku] ‘back’

/h/ voiceless glottal continuant

→ \[h\] /\_u

→ \[h\]

hu’u [hu’u] ~ [hu’u] ‘give; tree’
waha [waha] ‘west’
\( /i/ \) high front unrounded vowel
\[ \rightarrow [i, ɪ] \]

\( ina \) \( [i\text{na}] \) ‘mother’
\( jari \) \( [d\text{jari}] ~ [dari] ~ [zari] \) ‘so, thus, then’

\( /u/ \) high back unrounded vowel
\[ \rightarrow [u] ~ /oC_{0-}, \ w_{-} \] dominant allophone in Tomea, Binongko and Mandati-Lia sub-dialects of Wanci
\[ \rightarrow [o, wu] \]

\( tolu \) \( [t\text{olu}] \) ‘three’
\( tuhu \) \( [t\text{uhu}] \) ‘descend’

\( /e/ \) mid-closed front unrounded vowel
\[ \rightarrow [e, ɛ] \]
\[ \rightarrow [e] ~ /__\# \]

\( ela \) \( [e\text{la}] ~ [e\text{la}] \) ‘tongue’
\( mele \) \( [me\text{le}] \) ‘request, ask’

\( /o/ \) mid back rounded vowel
\[ \rightarrow [o] \]
\[ \rightarrow [o] ~ /__u, __(C)(o)\#, (p,mp,b,mb,m,w,\_b) __ \]

‘obu’ \( [\text{obu}] \) ‘dog’
‘ooloo’ \( [\text{o\text{oloo}}] \) ‘day, sun’

\( /a/ \) low unrounded vowel
\[ \rightarrow [a, ə] \]

\( attu \) \( [\text{a\text{tutu}}] \) ‘that’
\( ‘eka \) \( [\text{e\text{ka}}] \) ‘climb’

For typographic convenience whenever text is not enclosed in phonetic or phonemic brackets in the rest of this description the following conventions will be assumed when writing the phonemes. Further discussion of orthographic representations of Tukang Besi can be found in section 2.6.

Phonemes:

\[ \begin{array}{cccccc}
\text{p} & \text{t} & \text{tʃ} & \text{k} & \text{ʔ} \\
\text{(b)} & \text{(d)} & \text{dʒ} & \text{g} \\
\text{β} & \text{ɡ} & \text{h} \\
\text{β} & \text{s} & \text{ŋ} \\
\text{m} & \text{n} & \text{ŋ} \\
\text{mp} & \text{nt} & \text{ŋ} \\
\text{mb} & \text{nd} & \text{ndʒ} & \text{ŋ} \\
\text{r} & \text{l} \\
\end{array} \]
Orthography:

<table>
<thead>
<tr>
<th>p</th>
<th>t</th>
<th>c</th>
<th>k</th>
<th>'</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>d</td>
<td>j</td>
<td>g</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>w</td>
<td>s</td>
<td></td>
<td>h</td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>n</td>
<td>ng</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>nt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ns</td>
<td>ngk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mb</td>
<td>nd</td>
<td>nj</td>
<td>ngg</td>
<td></td>
</tr>
</tbody>
</table>

Minimal pairs amongst the vowels

- **balu** ‘buy’
- **balo** ‘answer’
- **bala** ‘classifier for soap’
- **bale** ‘young frond of coconut tree’
- **bali** ‘turn around’

Minimal contrasts amongst the (suspicious) consonants:

- /m/ - /n/ - /ŋ/ 
  - **ama** ‘father’
  - **ana** ‘child’
  - **'anga** ‘gills’
- /mp/ - /mb/ 
  - **kompa** ‘eel’
  - **komba** ‘moon’
- /r/ - /h/ - Ø 
  - **'ada** ‘send’
  - **hada** ‘imminent’
  - **ada** ‘borrow’
- /l/ - /r/ 
  - **pa’a** ‘thigh’
  - **paha** ‘thunder’
- /t/ - /r/ 
  - **titi** ‘breast’
  - **tinti** ‘run’
- /d/ - /pd/ 
  - **pidi** ‘rubbish’
  - **pindi** ‘firm excrement’
- /l/ - /r/ 
  - **tutu** ‘blunt’
  - **turu** ‘beat a fish unconscious’
- /l/ - /r/ 
  - **ala** ‘fetch’
  - **ara** ‘if’
2.1.3 Vowel sequences

The following clusters of vowels have been found to occur morpheme internally:

<table>
<thead>
<tr>
<th>Vowel Clusters</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>VV: aa ae ai ao au</td>
<td>ngaa bae hebai hao rau</td>
</tr>
<tr>
<td>VV: ea ee ei eo eu</td>
<td>mea ree lei ngeo deu</td>
</tr>
<tr>
<td>VV: ia ie ii io iu</td>
<td>mia kie mohii si'o'oloo liu</td>
</tr>
<tr>
<td>VV: oa oe oi oo ou</td>
<td>soroa doe loilo i'oloo rou</td>
</tr>
<tr>
<td>VV: ua ue ui uo uu</td>
<td>wunua 'ue wui koruo wakutuu</td>
</tr>
</tbody>
</table>

Diphthongs & Vowel sandhi rules

Vowels across a word boundary often show sandhi effects such that one of the vowels is eclipsed (the first of the two), or a partial loss of features of both of the vowels creates a new phonetic shape, slightly longer than a normal single vowel, as seen in the examples below:

<table>
<thead>
<tr>
<th>Example</th>
<th>Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>/a/ + /a/ → [a:]</td>
<td>awana atu</td>
</tr>
<tr>
<td>/a/ + /u/ → [o], [wu]</td>
<td>manusia u kampo</td>
</tr>
<tr>
<td>/a/ + /e/ → [e]</td>
<td>'awa e sura</td>
</tr>
<tr>
<td>/a/ + /i/ → [i], [e]</td>
<td>wila i daoa</td>
</tr>
<tr>
<td>/o/ + /i/ → [e:]</td>
<td>rato i Wanse</td>
</tr>
</tbody>
</table>
Phonology and morphophonology

/u/ + /a/ → [ɔ], [u] watu ana ['watuna.]
/u/ + /e/ → [e] balu e ika ['baleika.]
/e/ + /u/ → [œ] te uwe ['teuai.]

At the end of a word the final vowel in the suffix -mo (perfective) can be deleted, without any effect on the already-established stress patterns; Thus

ku-halihali-mo → [ku,halilali'mo] ‘I’m off for a stroll.’

Before an initial consonant in a following word, the vowel after ‘mo’ or ‘no’ is deleted, and the [n] or [m] becomes a nasal homo-organic to the initial consonant of the following word:

bangka no paira → [bangka'paira.] ‘Which boat?’
nomangamo te bae → [nomangamo'bae] ‘He ate the rice.’
la'amo ku'ita'e → [la'amoa'kita'e] ‘I just saw it.’

This process of word final vowel deletion has been extended in north coast dialects, so that now in casual speech any vowel can delete finally, or become voiceless after a voiceless consonant:

V → Ø, V [-voice] / C __ #
( [-voice])

e.g.,

no-manga bae [no,manga'bae] ‘He’s a rice-eater.’
ku-'awa'-e na ika [ku'awa'a'ena'ika] ‘I got a fish.’
gonti-'e [gonti'e] ‘Chop it down!’

2.1.4 Glottal stops

The sequences of vowels exemplified in table 1 above may be compared with the corresponding forms that exhibit a medial glottal stop:

<table>
<thead>
<tr>
<th>Vowel Clusters Interrupted by a Glottal Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>a’a</td>
</tr>
<tr>
<td>ma’a</td>
</tr>
<tr>
<td>‘yawn’</td>
</tr>
</tbody>
</table>
The lack of glottal stops following /i/, the high front member of the vowel inventory, is conspicuous. Since this has the lowest frequency of the vowel phonemes in Tukang Besi, this may simply reflect insufficient sampling (the above tabulation is based on a corpus of approximately 2,000 words), though the attested presence of glottal stops in all other combinations (with the exception of /e/o; again, this may reflect the fact that /e/ and /o/ are relatively infrequent vowel phonemes) points to this being a systematic absence. The presence of an /i?i/ sequence is not surprising, in light of the tendency for glottal stops to appear at morpheme boundaries between identical high vowels (described below).

Despite the limited number of relevant examples, table 2 does indicate that the presence or absence of a glottal stop is phonemic in Tukang Besi, regardless of its unusual behaviour. In Tomea and Binongko, and to a lesser extent on Wanci, a glottal stop can be responsible for non-phonemic glide formation, if it precedes a high vowel, as described in the following rule:

\[
\begin{align*}
? \quad + \quad V \\
G \quad + \quad + \quad \text{high} \\
\alpha \quad \text{back} \\
\text{syllabic} \quad \text{syllabic} \\
\end{align*}
\]

Examples:

\[
\begin{align*}
gora' u & \quad [\text{go'ra'u}] \sim [\text{go'ra'v}] \quad \text{‘egg’} \\
mo'ini & \quad [\text{mo'ini}] \sim [\text{mo'yini}] \quad \text{‘shy, embarrassed’} \\
\text{(Tomea, Binongko)}
\end{align*}
\]

Compare this rule of glide formation with that described in section 2.1.7, which forms
glides progressively rather than regressively when adjacent to velar prenasalised stops.

Non-phonemic glottal stops

Non-phonemic occurrences of glottal stops can be found in three main environments:

1. before an imploded stop phoneme that follows a stressed syllable;
2. after a vowel in a word spoken with strong stress (anger, etc.);
3. between two vowels that occur in adjacent syllables as a result of morphological, syntactic or pragmatic factors.

Examples of 1. are:

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>tokabi</td>
<td>[tɔˈkaːbi]</td>
<td>‘lost’</td>
</tr>
<tr>
<td>podi</td>
<td>[pɔdɪ]</td>
<td>‘chicken louse’</td>
</tr>
<tr>
<td>baga</td>
<td>[baga]</td>
<td>‘cheek’</td>
</tr>
</tbody>
</table>

Examples of 2. are:

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ana</td>
<td>[aˈnaʔ]</td>
<td>‘Child!’</td>
</tr>
<tr>
<td>dahani</td>
<td>[dəˈhani]</td>
<td>‘(How would I) know (?)’</td>
</tr>
<tr>
<td>mai</td>
<td>[maʔi]</td>
<td>‘Come! (for heaven’s sake!)’</td>
</tr>
</tbody>
</table>

Examples of 3. are:

<table>
<thead>
<tr>
<th>Word</th>
<th>Pronunciation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>waa-aku</td>
<td>[waʔaku]</td>
<td>‘Tell me!’</td>
</tr>
<tr>
<td>di iso</td>
<td>[diˈiso]</td>
<td>‘Over there’</td>
</tr>
<tr>
<td>koru-uo</td>
<td>[kʊruˈuo]</td>
<td>‘Many! (&lt;koruo)’</td>
</tr>
</tbody>
</table>

This insertion of a glottal stop at a morpheme boundary is never compulsory, but is most likely to occur:

1. between like vowels
2. between high vowels

Thus /e$o/ is less likely to have a glottal stop inserted than is /a$ə/, which in turn is less likely than /i$u/ or /i$i/, which is almost inevitably interrupted by a glottal stop.

The last example in 3. above shows reduplication of the vowel in the stressed syllable, to achieve an emphatic effect; this reduplication will always present a ‘boundary’ between two like vowels, and so is a prime candidate for glottal stop insertion.

The glottal stop /ʔ/ shows morphophonemic alternations with [k] in a restricted environment: if it is part of the object suffix or nominalising suffix, following a root whose last consonant is a glottal stop, it surfaces as [k]; i.e.,
$\mathbf{2}$  

\[ \begin{align*} 
\text{Examples:} \\
\text{‘ido} + \text{‘a} \rightarrow \{\text{[f̚ɪd̂ə]}\} & \quad \text{‘place of birth'} \\
\text{moro’u} + \text{‘a} \rightarrow \{\text{[morə’u̯kə̯]}\} & \quad \text{beverages'} \\
\text{like} + \text{‘e} \rightarrow \{\text{[lɪkə̯e̯]}\} & \quad \text{‘wake someone up'} \\
\text{hu’u} + \text{‘e} \rightarrow \{\text{[hʊ̯kə̯e̯]}/[hʊ̯kə̯e̯kə̯]\} & \quad \text{‘give to'} \\
\text{BUT ngo’o} + \text{‘u} \rightarrow \{\text{[ŋo’o̯u̯]}\} & \quad \text{‘your nose'} \\
\text{NOT} \rightarrow *\{\text{[ŋo’o̯kə̯]}, [ŋo’o̯u̯u̯]\} & \\
\end{align*} \]

Note that the glottal stop in the above example does not change to a [k], but rather disappears in the syllable following the first glottal stop:

\[ \begin{align*} 
\text{\#} \rightarrow \text{Ø} & \quad \text{\# V $\ldots$ (not -2e, -2a)} \\
\end{align*} \]

Further examples of this deletion are:

\[ \begin{align*} 
/\text{moro’u} + /\text{ku}/ & \rightarrow \{\text{[morə’u̯ku̯a̯]}\} \quad \text{‘Drink as well.’} \\
/\text{hu’u} + /\text{a} & \rightarrow \{\text{[hʊ̯kə̯a]}\} \quad \text{‘You obtain.’} \\
\end{align*} \]

For some speakers (predominantly on the north coast), sequences of glottal stops in adjacent syllables are allowed in some words, but not in others:

\[ \begin{align*} 
\text{helo’a} + \text{‘a} \rightarrow \{\text{[helo’o̯a]}\} & \quad \text{‘cooking place’} \\
\text{BUT} \\
\text{moro’u} + \text{‘a} \rightarrow \{\text{[morə’u̯kə̯]}\} & \quad \text{‘beverages’} \\
\end{align*} \]

We can observe that there is a general process of glottal dissimilation in adjacent syllables; in some cases the dissimilation is accomplished by deletion, in others by the second glottal stop becoming a [k]. The existence of such forms as [helo’o̯a], however, indicates that this rule of glottal dissimilation must be lexically specified, and not an absolute rule in the language. It is worth noting that the same speakers who allow this glottal - vowel - glottal sequence do delete a glottal stop which is part of a possessive suffix: [helo’o̯a]a, < helo’a - ‘a - ‘u, ‘your cooking place.’

2.1.5 The glottal continuant

The phoneme /h/ is regularly realised as [h] in most environments, but in casual speech before /u/, rather than [hɯ̯t], the sequence is more often realised as [hʊ̯t]. This is regular in Wanci, but in the southern islands of Tomea and Binongko, where the usual realisation of the /w/ phoneme is not [f̚] but [ʃ], the resulting phonological confusion of the sequence /wu/ ([ʃʊ̯u̯]) has resulted in a reinterpretation of the /w/ in several /wu/ clusters as an /h/. For example:
2.1.6 Realisations of the imploded stops

The stops that are described as implosive have varying realisations. The labial phoneme /b/ shows the strongest implosion of the three, almost always appearing with a clearly identifiable amount of implosion to distinguish it from the loan phoneme /b/. Similarly with /d/, there is enough implosion to distinguish the contrast with the loan allophone /d/, but noticeably less implosion than would typically accompany /b/ in a similar environment. In the case of /g/, implosion is not part of the normal realisation of the phoneme, and the words native to Tukang Besi and those of foreign origins show the same allophones; the loan words have been assimilated into Tukang Besi with a loan /g/ interpreted as a Tukang Besi /g/, testifying to the very minimal load born by implosion as a distinctive feature of the velar phoneme. This has an obvious articulatory explanation in the fact that there is less room in the vocal cavity between a velar closure and the glottis than there is between a labial closure and the glottis, and so it is harder to reduce the air pressure (by means of the glottis-lowering mechanism that distinguishes imploded stops) sufficiently to create distinctive implosion. That the loan words are not simply borrowed with a loan phoneme of very similar phonetic shape (i.e., a /g/ to parallel the /d/ and /b/ that have been incorporated) is shown by the behaviour of the /g/ in lax and post-stressed environments.

In lax environments (informal, no emphasis or primary stress) between vowels, a /g/ may lenite to a /ŋ/:

/nogogod/ → [ŋoŋuŋgud] ‘they make noise’

In a post-stressed position, /g/ (as well as /d/ and /t/, BUT NOT /b/ and /d/) shows the greatest tendency to implode, and can also be pre-glottalised to some extent. This is the environment that displays the strongest implosion, especially noticeable with /g/ and /k/, and with all the voiced stops pre-glottalisation is frequently heard in this position.

<table>
<thead>
<tr>
<th>Word</th>
<th>Realisation</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>kabongo</td>
<td>[ka′boŋo]</td>
<td>‘deaf’</td>
<td>(&lt; Indonesian babi)</td>
</tr>
<tr>
<td>molobu</td>
<td>[mo′loˈbu]</td>
<td>‘straight’</td>
<td></td>
</tr>
<tr>
<td>Babi</td>
<td>[ˈbaβi]</td>
<td>‘pig’</td>
<td></td>
</tr>
<tr>
<td>kadola</td>
<td>[ka′daˈla]</td>
<td>‘chicken’</td>
<td></td>
</tr>
<tr>
<td>pada</td>
<td>[paˈda]</td>
<td>‘sword grass’</td>
<td></td>
</tr>
<tr>
<td>Nodomi</td>
<td>[no′doˈmi]</td>
<td>‘they play domino-cards’</td>
<td>(&lt; Indonesian ‘domino’)</td>
</tr>
<tr>
<td>Nogopo</td>
<td>[no′goˈpo]</td>
<td>‘it is foggy’</td>
<td></td>
</tr>
<tr>
<td>To’oge</td>
<td>[tuˈoʒe]</td>
<td>‘big’</td>
<td></td>
</tr>
<tr>
<td>AND Pajoge</td>
<td>[paˈdʒoʒe]</td>
<td>‘dance’</td>
<td>(&lt; Indonesian joget)</td>
</tr>
</tbody>
</table>

From these examples it can be clearly seen that the /g/ in the loanword joge (< Malay joge)
is treated identically to the /ŋ/ in to’oge.

2.1.7 Realisations of the prenasalised phonemes

The prenasalised stops are orthographically represented as follows, with the following major allophones:

- /mp/ → \{mp\} [mp], [m̩p]
- /mb/ → \{mb\} [mb], [m̩b]
- /nt/ → \{nt\} [nt]
- /nd/ → \{nd\} [nd], [n̩d]
- /ns/ → \{ns\} [ns], [n̩s]
- /ndʒ/ → \{nj\} [ndʒ]
- /ŋk/ → \{ŋk\} [ŋk]
- /ŋg/ → \{ŋg\} [ŋg], [ŋ̩g]

As can be seen, the realisations of the prenasalised series show more than simply a homorganic nasal plus stop series. The voiced members /ngg/, /nd/ and /mb/ provide interesting geminate allophones; these allophones appear in casual speech, in free variation with the normal allophones, but with low frequency. Thus, in casual speech we find the following variants:

- bambai [ba’mbai] ~ [ba’mba] ‘comb’
- ndanga [na’dange] ~ [na’nge] ‘jackfruit’
- dinggawi [d’agawi] ~ [d’agavi] ‘yesterday’

Notice that the tendency is for a phonetically complex but phonemically unitary cluster (such as [m] + [b]) to alternate in casual speech with a geminate that separates the two phonetic elements into two (perceptual to a non-native speaker) timing units; the /m/ in bambai requires additional length, and the /n/ in ndanga is audible as two syllables. Note that the same ‘splitting’ phenomena is observed in extremely forceful speech (see section 2.10, note 2). This might suggest that the reality of the ‘phonemic unit’ that is represented as, for example /mb/, is actually at some level felt to be two separable units.

The lenition of /NC/ to [NN] also allows phonetic glides to form under the influence of a preceding vowel, as seen in ‘yesterday’ in the examples above; this can be captured in the following rule:

\[
V + \text{NC} \rightarrow V \begin{cases}
\text{N} : + \text{high} \\
\alpha \text{ back} \\
+ \text{syllabic}
\end{cases} \quad G \begin{cases}
\text{N} : + \text{high} \\
\alpha \text{ back} \\
- \text{syllabic}
\end{cases}
\]

This rule restricts the occurrence of glide formation to the environment immediately following a velar phoneme ([+ high]). A further example is given below:

- tungga ‘oloo [tu’nga o’lo] ~ [tu’nga o’lo] ‘everyday’
The phoneme /ns/ may produce [ns] as an allophone, but is more likely to be manifested as an [s], with nasalisation on the preceding vowel:

\[ \text{mansa} \quad [\text{m\=ansa}] \quad \sim \quad [\text{m\=a}sa] \quad \text{‘silat (fighting arts)’} \]

The lack of a preceding vowel in word-initial position may be a reason for the (according to the data collected so far) lack of initial /ns/ sequences, despite their root-initial appearance (e.g., in ma-nsuana ‘old’) (though see chapter 11 for a discussion of the productivity of the putative prefix mo-).

Finally, /mp/ has the allophone [m̥p̥] in free variation with [mp] before a non-high back or low vowel:

\[ \text{monimpala} \quad [\text{m\=om\=impala}] \quad \sim \quad [\text{m\=om\=impala}] \quad \text{‘homesickness, miss’} \]

The distribution of [m̥p̥] parallels that of the [b̥] allophone of [b̥], suggesting that [m̥p̥] is not an allophone special to the prenasalised character of the phoneme, but rather special to the bilabial articulation.

2.1.8 Loan phonemes

The phonemes /b̥/, /d̥/ and /c̥/, /j̥/ are found only in loan words of recent origin. The most frequent of these, /b̥/, is present only in more recent loan words, and speakers identify it as the ‘Indonesian’ way to say a ‘b’, not the Tukang Besi way. The phonemes /d̥/ and /j̥/ ([d̥] and [d̥5]) are found only rarely in loans, and the difference between the two is inconsistently maintained, a fact also very much apparent in the Indonesian spoken by many Tukang Besi speakers. Although /d̥/ is more likely to be realised as [d̥5] than /j̥/ as [d], both cases of transference occur. Thus we find:

\[
\begin{align*}
\text{Indonesian ‘domba’} & \rightarrow [d\=\text{om\=pa}] \quad \text{‘sheep’} \\
& \quad \text{(rarely [d\=up\=pa])} \\
\text{Indonesian ‘jadi’} & \rightarrow [d\=\text{ari}], [d\=\text{ari}] \quad \text{‘so, thus’} \\
& \quad \text{(Rupu [\text{za\=ri}])}
\end{align*}
\]

The other loan palatal consonant, /c̥/, is usually only realised by younger speakers, where older speakers will produce instead a [s]:

\[
\begin{align*}
\text{Indonesian ‘bicara’} & \rightarrow [\text{bi\=s\=ara}] \quad \text{‘say’} \\
\text{Indonesian ‘camat’} & \rightarrow [\text{\=ca\=ma}], [\text{\=j\=ama}] \quad \text{‘district officer’}
\end{align*}
\]

2.2 Extra-phonemic issues

2.2.1 Extra-phonemic sounds

Not all of the sounds heard from Wanci speakers conform to all of these conventions, sounds in the class of interjections or imitatory noises. Amongst others, these include:

\[ [\text{\=zen\=e}] \quad \text{‘surprise, mild shock’} \]
2.3 Syllable level processes

2.3.1 Phonotactics

The canonical form of a root is disyllabic, and each syllable consists of:

\[ S \rightarrow (C) V \]

The language will obviously allow no phonemic consonant clusters or final consonants, but will allow vowel clusters. This analysis is facilitated by the analysis of complex phonetic units such as [mp] as unitary pre-nasalised phonemes; this may be justified on the grounds that there are no other unambiguous consonant clusters in Tukang Besi, and that the pre-nasalised series parallel the distribution of the regular stops:

<table>
<thead>
<tr>
<th>INITIAL</th>
<th>MEDIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>peku</td>
<td>pepe</td>
</tr>
<tr>
<td>‘backfist’</td>
<td>‘slap’</td>
</tr>
<tr>
<td>beka</td>
<td>kobe</td>
</tr>
<tr>
<td>‘cat’</td>
<td>‘correct’</td>
</tr>
<tr>
<td>meha</td>
<td>rame</td>
</tr>
<tr>
<td>‘red’</td>
<td>‘lou, busy’</td>
</tr>
<tr>
<td>mpa’ampa’a</td>
<td>tumpe</td>
</tr>
<tr>
<td>‘sea urchin’</td>
<td>‘first born’</td>
</tr>
<tr>
<td>mbeaka</td>
<td>leme</td>
</tr>
<tr>
<td>‘not’</td>
<td>‘taut’</td>
</tr>
<tr>
<td>tenda</td>
<td>letere</td>
</tr>
<tr>
<td>‘storage shelf’</td>
<td>‘11 measure’</td>
</tr>
<tr>
<td>dahani</td>
<td>pidi</td>
</tr>
<tr>
<td>‘to know’</td>
<td>‘rubbish’</td>
</tr>
<tr>
<td>nangu</td>
<td>wini</td>
</tr>
<tr>
<td>‘to swim on the surface’</td>
<td>‘wash playfully, splashingly’</td>
</tr>
<tr>
<td>(kede) ntigi</td>
<td>tinki</td>
</tr>
<tr>
<td>‘(sit) squatting’</td>
<td>‘run’</td>
</tr>
<tr>
<td>ndanga</td>
<td>pindi</td>
</tr>
<tr>
<td>‘jackfruit’</td>
<td>‘firm excrement’</td>
</tr>
<tr>
<td>(ma) nsuana</td>
<td>hansi</td>
</tr>
<tr>
<td>‘old (person)’</td>
<td>‘heavy chopping sword’</td>
</tr>
<tr>
<td>kaluku</td>
<td>motika</td>
</tr>
<tr>
<td>‘ripe coconut’</td>
<td>‘hard’</td>
</tr>
<tr>
<td>gai</td>
<td>baga</td>
</tr>
<tr>
<td>‘hook, pull’</td>
<td>‘cheek’</td>
</tr>
<tr>
<td>ngaal</td>
<td>anga</td>
</tr>
<tr>
<td>‘name’</td>
<td>‘gills of fish’</td>
</tr>
<tr>
<td>ngkaru</td>
<td>kangkau</td>
</tr>
<tr>
<td>‘carry’</td>
<td>‘crow’</td>
</tr>
<tr>
<td>nggala</td>
<td>dinggawi</td>
</tr>
<tr>
<td>‘to be exactly as’</td>
<td>‘yesterday’</td>
</tr>
</tbody>
</table>

Further support of the unitary analysis of the prenasalised sequences is in their treatment in reduplicated words. Reduplication as a process in Tukang Besi regularly copies the first two syllables of the word in question (see 2.5.4); thus, reduplicating produces the following forms:

\[ ‘ita' \rightarrow ‘ita-‘ita\]   \(\rightarrow\) ‘look’ \(\rightarrow\) ‘glance at’

\[ hesowui \rightarrow heso-hesowui \]   \(\rightarrow\) ‘wash playfully, splashingly’
If the N+C sequence was split over two syllables, the reduplicated form of ‘karambau’ (putatively syllabified ka.ram.ba.u) would be as follows:

\[ \text{karambau} \rightarrow * \text{karam-karambau} \rightarrow * \text{karangkarambau} \]

In fact, the reduplicated form is ‘kara-karambau’, consistent with the analysis that the [m] is assigned to the following syllable, and thus not included in the reduplicated part.

Finally, native speakers of the language are unanimous in their syllable division of words containing the prenasalised phonemes, always assigning the N+C sequence to the beginning of one syllable if asked to break a word up into syllables. Thus nolanda’e ‘they trampled it’ is always divided into syllables as:

\[ \text{nolanda'e} \rightarrow \text{no-la-nda-'e} \]

and never

\[ * \text{no-la-da-'e} \]  

(But see section 2.4.2)

### 2.3.2 Stress assignment

Stress is regularly assigned to the penultimate syllable of the word, and secondary stress is assigned to every second (phonetic) syllable preceding the stressed syllable. Thus, in the following examples stress is shown by a raised stress mark (\( ' \)) preceding the syllable with primary stress, and a lowered stress mark (\( _{-} \)) preceding syllables with secondary stress.

\[ ['kwidwar] \quad \text{‘kick with heel’} \]
\[ ['pends] \quad \text{‘rain’} \]
\[ [no'pande] \quad \text{‘It’s raining.’} \]
\[ [no'pandeho] \quad \text{‘It’s still raining.’} \]
\[ [ku'ba'ako] \quad \text{‘I’ll go home.’} \]
\[ [ku,pe'moro,co'akemo] \quad \text{‘I made her/him drink.’} \]

The major exception to this is the (common) case of a verb without object suffixing followed by a \( te \)-marked object, in which case the \( te \) is counted as part of the verb for the purposes of stress assignment:

\[ [no'ita te ke'ne'no] \quad \text{‘He saw his friend.’} \quad ( < no’ita te ke’ne’no) \]

This does not apply to the other articles that may appear post-verbally, \( na \) or \( i \), nor to object-suffixed verbs:

\[ [no'ita na ke'ne'no] \quad \text{‘His friend looked.’} \quad ( < no’ita na ke’ne’no) \]
\[ * [no'ita na ke'ne'no] \]
\[ [no'ita ke'ne'no] \quad \text{‘He saw his friend.’} \quad ( < no’ita’e na ke’ne’no) \]
\[ * [no,li'alo na ke'ne'no] \]

This is not merely a prosodic phenomenon concerning the syllabic length of a word, since adding a perfective clitic to the verb will not affect the process of the \( te \) article being treated as part of the preceding word, phonologically: \[ [no,li'alo te ke'ne'no] \].
The rules of stress-assignment become more complicated when we consider words with four or more vowels in which not every ‘syllable’ has an initial consonant, thus creating forms with two (or more) adjacent vowels. In order to adequately account for these cases we need to consider an analysis that uses both morae and syllables. The rules for mora assignment are simply that every vowel is assigned to its own mora. The rules for syllable assignment are that every mora is assigned to its own syllable provided that

(a) it is the final or penultimate mora;  
   (i.e., * __ µ µ #)
(b) it is not adjacent to another vowel  
   (i.e., * (V) __ (V) )

An example of this can be seen in the word *waliako* ‘return’, which has the following mora and syllable assignments (primary and secondary stress are indicated as well, with one ‘x’ indicating secondary stress, and ‘xx’ indicating primary stress):

```
wa  li  a  ko
morae | | | |
syllables σ σ σ σ
stress  x - xx -
```

Although the morae *li* and *a* present a sequence of two vowels, since the *a* occurs in the penultimate position it is automatically assigned to a separate syllable. If a perfective clitic was added to the end of the word, changing the number of morae, then a different picture of syllable assignment would appear due to the changed positions of the morae within the phonological word. Now *ko* and *mo* occupy the two final mora positions, and *li* and *a*, as adjacent vocalic segments, are assigned to the same syllable, creating a diphthong - interestingly, it is not predictable from the different vowel qualities whether the resulting diphthong will be a rising or a falling one, and both are attested in free variation. Since there is a consonant between the vowel of *wa* and that of *li*, the mora containing *wa* is still assigned to a separate syllable.

```
wa  li  a  ko  mo
morae | | | | | | |
syllables σ σ σ σ
stress  x - xx -
```

Other examples follow:
Phonology and morphophonology

<table>
<thead>
<tr>
<th>ba</th>
<th>e</th>
<th>ba</th>
<th>e</th>
<th>su</th>
</tr>
</thead>
<tbody>
<tr>
<td>µ</td>
<td>µ</td>
<td>µ</td>
<td>µ</td>
<td>µ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>morae</th>
<th>σ</th>
<th>σ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>syllables</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
</tr>
</tbody>
</table>

| stress | xx | -  | xx | -  | xx | -  |

[bə e]  [bə e su]  [bə e ma mi]
‘rice’  ‘my rice’  ‘our (paucal) rice’

Compare the last derivation with a near-identical case that has a glottal stop separating the vowels, and an additional case in which the irrelevance of adjacent vowels in the final two morae may be seen:

<table>
<thead>
<tr>
<th>ba</th>
<th>e</th>
<th>ma</th>
<th>mi</th>
</tr>
</thead>
<tbody>
<tr>
<td>µ</td>
<td>µ</td>
<td>µ</td>
<td>µ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>morae</th>
<th>σ</th>
<th>σ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>syllables</td>
<td>σ</td>
<td>σ</td>
<td>σ</td>
</tr>
</tbody>
</table>

| stress | x  | -  | xx | -  |

[bə e ma mi]  [bə ma wə]
‘our (paucal) fruit’  ‘Baubau, capital city of Buton’

The only remaining exception to this involves the /a/ vowel, which can form a diphthong with a following vowel (i.e., a rising diphthong). This is regularly found when the stress is found on the following vowel, and is observed with one preposition kua even though the /a/ occupies the primary-stressed position:

[bə ə ma mi]  [bə ma wə]
‘bathed’  ‘Bathe’

(In southern Tukang Besi the preposition is [ka] ~ [ka], from /ka(a)/, and so we can see that in both languages the stress is regularly on the /a/; this would be expected given that the origin of this preposition is (probably) local Malay ka (< Standard Malay < Standard Malay >) ‘towards’. Since no words other than case markers (which kua is not) may be monosyllabic, the addition of an extra vowel is not inexplicable)

Here the desyllabification of the /a/ to [wa] does not affect the count of syllables for the purposes of stress assignment, but simply joins the two vowels together into one syllable.
In the case of reduplication, or perceived reduplication, the reduplicated portion of the word is considered as a separate phonological word for the purposes of stress assignment.

\[
[\text{\textit{\textit{no'elo'elomo}}}]
\]

expected * \[\text{\textit{\textit{no'elo'elomo}}}\]  

\[
[\text{\textit{komokomoro}}]
\]

expected * \[\text{\textit{komokomoro}}\]  

\[
[\text{\textit{dutch komkommer}}]
\]

The acoustic correlates of stress in Tukang Besi are surprisingly uniform: rather than being a cluster of properties reflecting amplitude, fundamental frequency and duration, we find that there is a relatively constant, high pitch throughout the 'stressed' syllable, and that this is the primary correlate of phonological stress. It is worth speculating (Donohue 1994a) that Tukang Besi has an incipient pitch-accent system, with a pitch-based system developing though the regularisation of the realisation of an older (non-contrastive) stress system. Since the rules for stress assignment are regular, this new system would then represent a pitch-accent system with no functional load, but the presence of different stress-patterns in relatively recent loanwords has led to a (very small) number of words that contrast only through stress (see section 2.4.2).

2.4 Variable phonetic processes

2.4.1 Gemination

Gemination of certain consonants is a feature of Tukang Besi that sets it apart from the other languages of the Southeast Sulawesi area; vowel gemination was exemplified in section 2.1.2 (‘Non-phonemic glottal stops’), and geminate nasals arising from the prenasalised phonemes were dealt with in section 2.1.6. In addition to these, in the right environments the following consonants may optionally geminate, especially in Kaledupa, Tomea and Binongko speech, and less frequently but still noticeably in Wanci:

\[
p \quad t \quad k
\]

\[
m \quad n \quad \text{ŋ}
\]

\[
s
\]

1 (alveolar allophone)

Gemination occurs in the first place on the consonant of the stressed (penultimate) syllable:

\[
[\text{topage. motuwurw melasi molomwurw}]
\]

‘cut branches’ ‘sleepy’ ‘far’ ‘hungry’ (Tomea, Binongko)

If the stressed syllable is also the initial one (i.e., the word is di-syllabic), the gemination can jump one syllable forward:
This jump forward is allowed if and only if the phonemic consonant in the stressed syllable is \textit{not} one of the following:

\[
\begin{array}{llll}
\text{mp} & \text{nt} & \text{nt} \\
\text{mb} & \text{nd} & \text{ng} \\
\text{m} & \text{n} & \overline{\text{g}} \\
\text{w} &
\end{array}
\]

Thus the following do \textit{not} show gemination:

\[
\begin{array}{ccccccc}
\text{[mə dip]} & \text{mondilur} & \text{[bila]} & \text{lomo} & \text{ma'pa}] \\
\text{‘afraid, fear’} & \text{‘sour’} & \text{‘go’} & \text{‘cloud’} & \text{‘eat’} \\
\text{* [mə də kə] } & \text{* [mondilur] } & \text{* [bila] } & \text{* [lomo] } & \text{* [ma'pa] }
\end{array}
\]

Note that this does not apply to non-phonemic glottal stops:

\[sabə 'anne \ (\text{< sabane}, \text{with stressed vowel gemination for pragmatic effect and concomitant glottal stop insertion})\]

If a consonant qualifies for gemination, the addition of pronominal prefixes or suffixes will sometimes affect the placement of gemination. Details on why the geminate consonant changes in some cases but not in others are not yet known. Some examples:

\[\text{[pala]/ } \rightarrow \text{[papa] } \rightarrow \text{[topapa]} \rightarrow \text{[topapa]e} \rightarrow \text{[topapa]e} \]

\[\text{‘branch’ } \rightarrow \text{‘branch’ } \rightarrow \text{‘we cut branches’ } \rightarrow \text{‘we cut the branches’ } \rightarrow \text{[topapa]e} \]

\[\text{[pono]/ } \rightarrow \text{[pono] } \rightarrow \text{[pono]e} \rightarrow \text{[pono]e} \]

\[\text{‘suck’ } \rightarrow \text{‘suck’ } \rightarrow \text{‘suck it’ } \rightarrow \text{[nopono] } \rightarrow \text{[nopono]e} \rightarrow \text{[nopono]e} \]

Lastly, certain vowel environments must be satisfied in order to qualify the consonants for gemination or not, different for different consonants:
/pl, /kl/: \[ V \rightarrow V \]
\[ \begin{align*}
\text{- high} & \rightarrow \text{- high} \\
\text{< + low>}_\alpha & \rightarrow \text{< - low>}_\alpha \\
\text{< + back>}_\beta & \rightarrow \text{< + back>}_\beta
\end{align*} \]
i.e., after /a e o/, and before /a o i u/; a__a and o__i not allowed

/h/: \[ V \rightarrow V \]
\[ \begin{align*}
\text{< + high>}_\alpha & \rightarrow \text{[\alpha low]} \\
\text{< + back>}_\beta & \rightarrow \text{[\alpha high]}
\end{align*} \]
i.e., after /o i u/ and before /a i u/

/m/, /n/, /ng/: \[ V \rightarrow V \]
\[ \begin{align*}
\text{< + back>}_\alpha & \rightarrow \text{< + back>}_\alpha \\
\text{< + low>}_\beta & \rightarrow \text{< + low>}_\beta
\end{align*} \]
i.e., after /o i u/ and before /o u/, or a__a

/s/: \[ V \rightarrow V \]
\[ \begin{align*}
\text{[ - back]} & \rightarrow \text{[\alpha low]} \\
\text{[ - low]} & \rightarrow \text{[\alpha high]}
\end{align*} \]
i.e., after /a e i/ and before /a i u/

/l/: \[ V \rightarrow V \]
\[ \begin{align*}
\text{[\alpha high]} & \rightarrow \text{[\alpha high]} \\
\text{- back} & \rightarrow \text{- back} \\
\text{- low} & \rightarrow \text{- low}
\end{align*} \]
i.e., after /e i/ (thus the retroflex allophone cannot be geminated), and /l/ must follow if preceded by /l/

The final note to the gemination rules is that they apply to the underlying forms; that is, the forms before [-um]- allomorphy (section 2.5.1) or nasal accretion (section 2.5.2) have taken place. For example, the following do not geminate even though the stress and vowel environments are suitable:

\[
\begin{align*}
\text{[ホーナウリ] ( < hoN-horu) } & \rightarrow \text{ ‘weave’ ( * [ホーナウリ])} \\
\text{[ほんお] ( < hoN-toha) } & \rightarrow \text{ ‘wash’ ( * [ほんお])}
\end{align*}
\]

In the first example, the underlying /h/ is not one of the consonants that can geminate, and in the second case the underlying /l/ is followed by an /o/, which disqualifies it from gemination. An underlying /n/ qualifies for gemination in this environment, furnishing proof that the gemination rule applies before the rule of nasal substitution.

2.4.2 Final nasals in loan words

The differential treatment of loanwords with different final nasals in Tukang Besi is quite interesting. The velar nasals are usually dropped (occasionally with compensatory vowel
lengthening), words ending with an [n] sometimes have the nasal preserved with a stress shift, or else drop it, and words with a final [m] either appear with a vowel added to the end of the word to enable it to fit the normal phonotactic constraints of the language, or sometimes simply appear with the nasal preserved and the stress shifted. Examples of all of these options are given below (other examples can be gleaned from the wordlists at the end of this book):

/m/: | om | ‘uncle’ | < Dutch | oom
    | he’lem | ‘motorcycle helmet’ | < Dutch | helm (helem)
    | ‘komo | ‘come (Ritual)’ | < Dutch | kom

/n/: | kra’ton | ‘palace’ | < Malay | kraton
    | bu’ton | ‘Buton island’ | < Ternate (?) | butu ~ buntun
    | buabu’aha | ‘fruits’ | < Malay | buabuahan
    | pengi’napa | ‘hotel’ | < Malay | penginapan

/ng/: | ‘gunti | ‘scissors’ | < Malay | gunting
    | ‘pau | ‘umbrella’ | < Malay | payung
    | pa'raa | ‘war’ | < Malay | pərang
    | tu'lungi ~ ‘help’ | < Malay | tolong
    ~ tu'lumi

The final nasals in some loanwords may seem a very strange borrowing pattern for a language that only allows vowel-final words, but the strangeness is mitigated in two ways:

1. The final nasals are borrowed as *syllabic* nasals, with the properties of vowels for the purposes of syllable counting and stress assignment. Thus, the final sequence in ‘helem’ is treated as a sequence of two morae; the [m] is held for a brief span and then released. This unusual interpretation by the Tukang Besi is possible because they are already familiar with the concept of syllabic nasals from the allophones of the prenasalised stops that have syllabic nasal components;

2. The exaggerated pronunciation of words with initial prenasalised stop clusters gives full syllabic status to the nasal component. Thus, the following are the normal pronunciations:

```
[ʃe \l̩e: ə tə]  ‘there is none’
[qa\i  tə]  ‘(I) don’t want (it)’
```

If annoyed, for example after being repeatedly asked and several times having to have given the same answer, a speaker may express exasperation with the (slightly rude) pronunciations:
‘there absolutely isn’t any’

(so stop bothering me!)

‘I really don’t want (it) at all!’

The existence of these syllabic nasals in the language, even in this sub-
phonemic form, seems to have been sufficient to allow the creation of loan
words with syllabic nasals in other places.

It appears, however, that some final syllabic nasals enjoy only a passing existence in
the language, leaving their impression on the stress patterns. The following treatment of the
Malay word [kəntaŋ] ‘potato’ (stressed on the first syllable in Sulawesi Malay) is a typical
example:

Loan word: ‘kentang’ ‘potato’ (< Malay)

1. Vowel transfer

2. Nasal syllabification

3. C# deletion

4. stress re-assignment

5. modern forms

All three levels of analysis are present on Wanci at the present, with younger speakers
analysing it at level 2, older speakers at level 3, and sophisticated younger-middle aged
speakers producing stage 3 and sometimes stage 4 forms. The vowel change at stage 3
applies in some speakers to prevent the formation of a homonym with kenta (archaic for
‘fish’). Note that at stage 3 [kəntaŋ] ‘fish’ and [kəntaŋ] are differentiated only by stress, thus
lending a fractional load to the part played by stress in the phonological system of the
language.

2.5 Processes involving nasals

2.5.1 Morpho-phonology

There are very few morphophonemic alternations in Tukang Besi. We have already seen
how the process of glottal dissimilation operates to stop glottal stops occurring in adjacent
syllables. There is also some allomorphy involved with a few verbal affixes involving
nasals (Allomorphy involving nasal substitution or nasal accretion is common in many
languages of Indonesia, Malaysia and the Philippines; see Newman (1984) for a survey of
the phenomenon). The first of these to be described involves the infix -[um]:

The -[um]- infix is inserted between the first consonant and the first vowel of the verb
after the subject prefix (the forms are illustrated with an alternation between realis and
irrealis pronouns as well; whilst commonly occurring together, irrealis pronouns are not a
prerequisite to the appearance of the infix; see chapters 7 and 15):

(Sub)-(C1)V(CV)... → (Sub)-(C1)[um]V(CV)
except when $C_1$ is a bilabial continuant, or is the beginning of one of a restricted group of derivational affixes. These exceptions are discussed below.

The -[um]- is regularly infixed for all consonants except /w/, /h/ and /m/. Non-infixed forms also occur in some predictable general cases of allomorphy, and for some lexically irregular roots. These are exemplified in (1) - (26).

/w/ and /h/ cases.

With a verb beginning with /w/, the -[um]- infix reduces to -[m]- and replaces the initial /w/ of the stem, thus:

(1) 'u-waliako $\rightarrow$ ko-[m]aliako 'you return home'
(2) 'u-hesowui $\rightarrow$ ko-[m]esowui 'you wash'

There are, however, counter-examples that show normal -[um]- allomorphy, as in the following:

(3) 'u-wikirii $\rightarrow$ ko-w[um]kirii 'you think'
(4) 'u-hali-hali $\rightarrow$ ko-h[um]ali-hali 'you stroll about'

Sometimes there is no realisation at all of the -[um]- infix:

(5) 'u-wila $\rightarrow$ ko-wila $\rightarrow$ ko-w[um]ila ($\neq$ ko-[m]ila) 'you go'

/m/ cases.

On a form beginning with an /m/, there is no realisation of the -[um]- infix:

(6) 'u-moro'u $\rightarrow$ ko-moro'u 'you drink'

It may be argued that it undergoes the same reduction as for /w/ stems, and then replaces the original /m/ with a morphologically induced [m]:

(7) 'u-moro'u $\rightarrow$ ko-[m]oro'u 'you drink'

There is of course no way of proving this one way or the other. Since the form

(8) $\rightarrow$ * ko-m[um]oro'u 'you drink'
never appears, we can safely say that there is a different process operating here than with the /w/.

General cases.

When the verb to which the -[um]- is attached is a complex verb, morpheme initial /p/ and /h/ may be elided and replaced with the [m]; when the verb to which the -[um]- is attached is a complex verb involving the pa- causative prefix an -[um]- is infixed in some cases, and the initial /p/ is elided and replaced with [m] in others:

<table>
<thead>
<tr>
<th>REALIS</th>
<th>IRREALIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(9) no-pa-kede</td>
<td>na-p[um]a-kede</td>
</tr>
<tr>
<td>(10) no-pa-wila</td>
<td>na-p[um]a-wila</td>
</tr>
<tr>
<td>(11) no-pa-leama</td>
<td>na-[m]a-leama</td>
</tr>
<tr>
<td>(12) no-pa-mente</td>
<td>na-[m]a-mente</td>
</tr>
<tr>
<td>(13) no-po-gau</td>
<td>na-[m]o-gau</td>
</tr>
<tr>
<td>(14) no-po-’awa</td>
<td>na-[m]o-’awa</td>
</tr>
<tr>
<td>(15) no-hepe-’ita</td>
<td>na-[m]epe-’ita</td>
</tr>
<tr>
<td>(16) no-he-lo’a</td>
<td>na-[m]e-lo’a</td>
</tr>
<tr>
<td>(17) no-heka-wou</td>
<td>na-[m]eka-wou</td>
</tr>
<tr>
<td>(18) no-ho-[ng]ali</td>
<td>na-[m]o-[ng]ali</td>
</tr>
<tr>
<td>(19) no-hoko-mate</td>
<td>na-[m]oko-mate</td>
</tr>
<tr>
<td>(20) no-hoto kompo</td>
<td>na-[m]oto kompo</td>
</tr>
</tbody>
</table>

Thus po-, he-, hoN-, heka-, hoko, hoto- and hepe- all drop their initial consonants in favour of the [m], and with pa- we can see that /p/ drops in favour of [m] if the root is non-agentive, and that [um] is regularly inserted after the initial /p/ if the root is agentive (compare ‘improve’ and ‘seat’).

In relative clauses it appears that a non-active /m/-initial verb modifying the relativised noun can show such phonetically unchanged [m] allophone, but with a different meaning:

(21) te mia melanga → te mia [m]elanga
    ‘the tall person’ ‘the tallest person’

(c.f., (22) te mia to’oge → te mia t[um]o’oge
    ‘the fat person’ ‘the fattest person’)

In combination with an vowel-initial stem, the infix sometimes reduces to [m], and sometimes remains a full [um], with no discernible governing factors:

(23) ala [m]ala ‘fetch’
(24) aso [um]aso ‘sell’
Lexical cases.

With the verb *nde'u* ‘not want’, the infix appears after the first consonant not of the stem, but of the subject prefix:

(25) $nu$-$nde'u$ \rightarrow n[um]u-$nde'u$ ‘you don’t want’
\rightarrow * $nu$-$nd[um]e'u$

With the verb *hu'u* ‘give’, an irregular form arises out of the combination of -$[um]$- with the verb root:

(26) $'u$-$hu'u$ \rightarrow ko-$[m]o'u$ ‘you give’
\rightarrow * ko-$[m]u'u$, ko-$h[um]u'u$

2.5.2 Nasal substitution

The prefix $hoN$- displays nasal substitution in a voiceless consonants following it. Nasal substitution is the common western Indonesian phenomenon of a nasal (of the same place) replacing a voiceless stop when the morpheme in question is added. This replacement does not occur if the stop is voiced:

<table>
<thead>
<tr>
<th>Word</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>?</td>
<td>$ho$-$[m]$oru ‘weave’</td>
</tr>
<tr>
<td>ha'o</td>
<td>$ho$-$[m]$a'o (G:63) ‘hammer’ ‘to hammer purposefully’</td>
</tr>
<tr>
<td>tutu</td>
<td>$ho$-$[n]$utu (G:7) ‘pound, smith’ ‘to make something (of a blacksmith)’</td>
</tr>
<tr>
<td>kumbu</td>
<td>$ho$-$[ng]$umbu (G:63) ‘arrowhead fist’ ‘to use an arrowhead fist’</td>
</tr>
<tr>
<td>kabali</td>
<td>$ho$-$[ng]$abali (G:63) ‘machete’ ‘to use a machete and cut with it’</td>
</tr>
<tr>
<td>?</td>
<td>* $ho$-$[m]$ai, * $ho$-$mbai ‘sew’</td>
</tr>
</tbody>
</table>

It can be seen that the nasal substitutions affect voiceless consonants, turning them into the nasal of the corresponding place, with the glottal /h/ taking /m/ (the most unmarked nasal) as its nasal counterpart. There are not many examples of this process occurring.
2.5.3 Reduplication and nasal addition

There are two forms of reduplication prevalent in Tukang Besi, disyllabic (the norm) and monosyllabic reduplication, and a further form (vowel reduplication) that is used for pragmatic effect to emphasise the truth values of one word sentences. Disyllabic reduplication refers to the repetition of the initial two syllables of the word, not counting a subject prefix of a verb as part of the word. Monosyllabic reduplication consists of only the first syllable being repeated (again, not counting the subject prefix), and vowel reduplication is the reduplication of the stressed vowel of the word. Examples of all of these can be found in the following:

Disyllabic reduplication:

\[
\begin{align*}
\text{te bokusu} & \quad \rightarrow \quad \text{te boku-bokusu} \\
\text{‘my book’} & \quad \rightarrow \quad \text{‘my books’ / ‘my little book’}
\end{align*}
\]

\[
\begin{align*}
\text{notinti} & \quad \rightarrow \quad \text{notinti-ntinti} \\
\text{‘He is running’} & \quad \rightarrow \quad \text{‘He’s running around madly.’}
\end{align*}
\]

Monosyllabic reduplication:

\[
\begin{align*}
\text{mo-lungu} & \quad \rightarrow \quad \text{mo-lu-lungu} \\
\text{‘wet’} & \quad \rightarrow \quad \text{‘slippery’}
\end{align*}
\]

\[
\begin{align*}
\text{mo-turu} & \quad \rightarrow \quad \text{mo-tu-turu} \\
\text{‘sleep’} & \quad \rightarrow \quad \text{‘be tired’}
\end{align*}
\]

Vowel reduplication:

\[
\begin{align*}
\text{koruo} & \quad \rightarrow \quad \text{koru-’uo} \\
\text{‘many’} & \quad \rightarrow \quad \text{‘certainly many’}
\end{align*}
\]

\[
\begin{align*}
\text{amai} & \quad \rightarrow \quad \text{ama-’ai} \\
\text{‘they’} & \quad \rightarrow \quad \text{‘certainly them’}
\end{align*}
\]

As can be seen, an initial voiceless stop is prenasalised if the reduplication is disyllabic; the other forms of reduplication do not produce nasal addition.

2.5.4 Further nasal addition

Prenasalisation is also observed when the object forms of the 1st and 2nd person plural pronouns are bound to numeral verbs to specify the number of people participating in an event:

\[
\begin{align*}
\text{towila tolu-ng-kita} & \quad \rightarrow \quad \text{‘We (all three) went.’} \\
\text{kowila dua-ng-kami} & \quad \rightarrow \quad \text{‘We both went.’} \\
\text{kiwumila tolu-ng-komiu} & \quad \rightarrow \quad \text{‘You three will go.’}
\end{align*}
\]
The third person plural object suffix begins with a glottal stop, and so has no corresponding nasal:

\[ \text{no'inte lima'e} \quad \text{‘They five went.’} \]

This is described in chapter 8.

Nasals are also added with the prefix \( \text{heN-} \) ‘\( x \)th time’

\[
\begin{align*}
\text{dua} & \quad \rightarrow \quad \text{he-n-dua} \quad \text{‘two times’} \\
\text{tolu} & \quad \rightarrow \quad \text{he-n-tolu} \quad \text{‘three times’} \\
\text{gana} & \quad \rightarrow \quad \text{he-ng-gana} \quad \text{‘four times’} \\
\text{paira} & \quad \rightarrow \quad \text{he-m-paira} \quad \text{‘how many times?’}
\end{align*}
\]

Note that the prenasalisation arising as a result of the prefix \( \text{heN-} \) affects the voiced stops, unlike the prenasalisation associated with reduplication. This is a different process from that found with nasal substitution (as described in 2.5.2) in that the original stop is not deleted; in \( \text{hentolu} \), the /t/ is not elided (compare with \( \text{tu}t\text{u} / \text{honutu} \) in section 2.5.2).

### 2.6 Orthographic issues

I have already introduced the conventions of writing the velar nasal as \{ng\}, the high back unrounded vowel as \{u\}, and the imploded stops as \{b\} and \{d\}, respectively. These spelling conventions basically follow those used in the writing of Indonesian, except for the addition of the imploded stops, and represent few problems either for phonological representation or for speakers learning an orthographic system (though see below for a discussion of the graphemes \{b\} and \{d\}).

Other typographical decisions are not so simple. Representing the glottal stop as \{ ‘ \} is accepted by most speakers, especially when it appears between two non-identical vowels, as in, for instance, the pair:

\[
\begin{align*}
\text{bae} & \quad \text{‘rice’} \quad \left[ \text{b}\text{a}\text{e} \right] \\
\text{ba’e} & \quad \text{‘fruit’} \quad \left[ \text{b}\text{ae} \right]
\end{align*}
\]

Word-initially speakers showed less tendency to write the glottal stop; thus \( \text{‘olo}\u0103 \) ‘sun’ is likely to be written as \( \text{olo} \). Between like vowels, the Indonesian convention of assuming a glottal stop is the preferred convention for most speakers:

\[
\begin{align*}
\text{saat} & \quad \text{‘moment’} \quad \text{(Indonesian)} \quad \left[ \text{s}\text{a}\text{a}\text{t} \right] \\
\text{saa} & \quad \text{‘snake’} \quad \text{(Tukang Besi)} \quad \left[ \text{s}\text{a}\text{a} \right] \\
\text{paira} & \quad \text{‘how many times?’} \quad \left[ \text{p}\text{air}\text{a} \right]
\end{align*}
\]

(in this grammar represented as \( \text{sa’a} \))

Speakers who have learnt to write glottal stops as \{ ‘ \} tend to write it in both phonemic and non-phonemic positions; thus, for instance, there is no underlying glottal stop between the two /a/ vowels separated by a morpheme boundary in \( \text{helo’ako} \) ‘cook for’. Nevertheless, speakers who have learnt to write glottal stops tend to write a glottal stop in
that position:

\[
\text{helo'a'ako} \quad \text{‘cook for’}
\]

(here represented as \text{helo'aako})

As might be expected, the convention in Indonesian of assuming a glottal stop between two like vowels makes the writing of a vowel sequence with two identical vowels contentious.

\[
\text{menti'i} \quad \text{‘fast’} \quad [\text{me'nii}] \quad \text{(here represented as menti’i)}
\]

\[
\text{mohii} \quad \text{‘left’} \quad [\text{mo'hii}] \quad \text{(here represented as mohii)}
\]

Some speakers distinguish phonemic and non-phonemic glottal stops in their writing; these speakers prefer to use the apostrophe to indicate a non-phonemic glottal stops, and use a macron above a vowel to indicate a following glottal stop. For instance:

\[
\text{[he'lo'o'a'ako] ‘cook for’ helo'a + ako/}
\]

would be written

\[
\text{heloa'a'ako}
\]

(here written heloa’ako)

These same speakers do not automatically add glottal stops between two identical orthographic vowels, yet do not use two vowels to represent a sequence of two identical vowels. Their orthographic representations of /menti/i/ ‘fast’ and /mohi/i/ ‘left’ are the following:

\[
\text{mentii} \quad \text{‘fast’} \quad [\text{me'nii}]
\]

\[
\text{mohi} \quad \text{‘left’} \quad [\text{mo'hii}]
\]

A final point of graphic choice remains in the issue of the representation of the imploded stops /b/ and /d/. Although these sounds do not contrast with plain voiced ones, most speakers who are familiar with Indonesian have no trouble distinguishing them from the sounds /b/ and /d/, referring to them as ‘the twenty-sixth and twenty-seventh letters of the alphabet’. Whilst most speakers accept the use of \{b\} and \{d\} for /b/ and /d/, a minority of speakers reject this as misleading, and not representative of the difference between the Indonesian pronunciation and their own, and feel that using the same symbolisation would lead to incorrect pronunciations. These speakers recommend \{bp\} for \(b\), and \{dt\} for \(d\), a surprisingly astute recognition of the fact that in fact these stops are not contrastively voiced, but rather contrastively imploded, and have both voiced and voiceless allophones. Since consonant clusters do not occur in Tukang Besi this is an option that could be used, but the simpler alternative has been used here.

Orthographically there also seems to be divided opinion on the representation of contracted forms. Some, such as \text{awanatu} < \text{awana atu}, are so lexicalised that they represent no problems, but others, such as \text{towe} < \text{te uwe}, are less acceptable when written. Intermediate between these two extremes are contractions like \text{mbeako wila} for
Word boundary decisions are also problematic. I have noticed a preference in many people’s writing to write KPs and PPs as single words, despite the pronunciation of the article *te* marking an object as one phonological word with a preceding verb. For example:

\[
\text{No-’elo te ’obu} \\
3\text{R-call CORE dog}
\]

‘She called the dog.’

\[
\{ \text{Noelo teobu} \}
\]

The object clitics that appear on verbs are also a source of word-boundary confusion; some speakers write these as separate words when they are polysyllabic, but as part of the verb when not, as in:

\[
\text{No-’elo-aku} \quad \text{No-’elo-ko} \quad \text{No-’elo-kita} \\
3\text{R-call-1SG.OBJ} \quad 3\text{R-call-2SG.OBJ} \quad 3\text{R-call-1PL.OBJ}
\]

‘She called me.’  ‘She called you.’  ‘She called us.’

\[
\{ \text{Noelo aku} \} \quad \{ \text{Noeloko} \} \quad \{ \text{Noelo kita} \}
\]

These same speakers acknowledge that the clitics are bound forms, leading to orthographic confusion.

Intonational cues are written with the standard punctuation symbols as are used in English and Indonesian, namely a comma (,), full stop (.), colon (:), and on occasion a semi-colon (;), though this latter is not often used in writing by Tukang Besi people. The pragmatic content of these punctuation symbols is roughly equivalent to that found in English or Indonesian when the same punctuation is used, although the perceptual cues are often different. Interestingly, in the light of the fact that Tukang Besi has an incipient pitch-accent system (section 2.3.2), both pitch and duration (the lengthening of a pre-pausal vowel) play a major part in the intonational system, according to the generalisations emerging from Nagano-Madsen’s work (1992, 1993) for a pitch-accent language. Despite only recently having acquired pitch as a lexically relevant phonological feature, it appears that Tukang Besi fits well into the mould for languages of that type as regards the realisation of intonation.