

### 3. PHONEMES

One has sixteen consonant phonemes; p, t, k, b, d, g, gb, s, z, m, n, ŋ, l, and r. The consonants are differentiated by contrast in the manner of articulation, into voiced and voiceless, stops and grooved fricatives, a lateral, and a flap. The stops contrast at the bilabial, dental, velar and labio-velar points of articulation. Nasals contrast at the bilabial, dental and velar points of articulation. The lateral and the flap are alveolar.

Vowels contrast in the high, mid and low tongue positions. The high and mid vowels contrast as to front unrounded and back rounded.

### 4. ALLOPHONIC PROCESSES

#### 4.1. Description of consonant phonemes

The allophonic sub-members of consonant phonemes vary freely for the most part. A few phonemes are sensitive to their environment. The Table C shows the allophonic description and distribution of contour phones. The subscript (<sub>~</sub>) indicates non-syllabicity when occurring beneath a vocoid, for example [u<sub>~</sub>] and an unreleased quality when beneath a voiceless stop, e.g. [p̚].

Phoneme /p/

Word initially and intervocally the phones [p], [p<sup>h</sup>], and [f] vary freely. Initially they vary with equal frequency but intervocally there is a higher frequency of [p<sup>h</sup>] and [f]. Syllable final [p̚] and [f̚] vary freely but following consonants [p] varies with [p<sup>h</sup>]. Free alternation is indicated by (˜).

/pani/	[pani]	˜	[p <sup>h</sup> ani]	˜	[fani]	<i>bamboo</i>
/kepe/	[kɛpe]	˜	[kɛp <sup>h</sup> e]	˜	[kɛfe]	<i>ground</i>
/gerep/	[gɛʔɛp]	˜	[gɛʔɛf]	˜		<i>fire</i>

Table C: Allophone distribution chart

Phonemes	/p/	/t/	/k/	/b/	/d/	/g/	/m/	/n/	/ŋ/	/s/	/z/	/l/	/r/	/gb/
Word initial	[p] [p <sup>h</sup> ] [f]	[t] [t <sup>h</sup> ]	[k] [k <sup>h</sup> ]	[b] [m <sup>b</sup> ]	[d] [n <sup>d</sup> ]	[g] [ŋ <sup>g</sup> ]	[m]	[n]	[ŋ]	[s] [z]	[z]	[l] [ɹ]	[r]	[gb]
Inter-vocalic	[p] [p <sup>h</sup> ]	[t] [t <sup>h</sup> ]	[k] [k <sup>h</sup> ]	[b] [m <sup>b</sup> ]	[d] [n <sup>d</sup> ]	[g] [ŋ <sup>g</sup> ]	[m]	[n]	[ŋ]	[s] [z]	[z]	[l] [ɹ]	[r]	[gb]
Syllable final	[p] [f]	[t] [t̚]	[k] [k̚]				[m]	[n]	[ŋ]					
Following consonants	[p] [p <sup>h</sup> ]	[t] [t <sup>h</sup> ]	[k] [k <sup>h</sup> ]				[m]	[n]	[ŋ]	[s]	[z]			

Phonemes /t/ and /k/

The phones [t] and [t<sup>h</sup>] vary freely and the phones [k] and [k<sup>h</sup>] vary freely word initially, intervocalically and following consonants. Intervocalically there is a higher frequency of the aspirated phones [t<sup>h</sup>] and [k<sup>h</sup>]. Phones [t̚] and [k̚] occur syllable final.

/teine/	[te <sub>i</sub> ne]	~ [t <sup>h</sup> e <sub>i</sub> ne]	<i>very</i>
/kito/	[kito]	~ [k <sup>h</sup> i <sup>h</sup> tho]	<i>kick, sweep</i>
/matko/	[ma <sub>t̚</sub> ko]	~ [ma <sub>t̚</sub> k <sup>h</sup> ho]	<i>toward the house</i>
/okante/	[okante]	~ [ok <sup>h</sup> ant <sup>h</sup> e]	<i>we (dl.) do</i>
/takot/	[takot̚]	~ [t <sup>h</sup> ak <sup>h</sup> hot̚]	<i>shirt</i>
/arokmaike/	[arokma <sub>i</sub> ke]	~ [arok <sub>m</sub> ai <sup>h</sup> k <sup>h</sup> e]	<i>he cries</i>
/gbalak/	[gbalak̚]		<i>white sand</i>

The following feature rules describe where the allophone of /p/, /t/ and /k/ occur. Some of the rules are labelled 'optional' to indicate free variation in a given position.

optional

$$(1) \begin{array}{c} \text{p, t, k} \\ \left[ \begin{array}{c} +\text{cns} \\ -\text{vd} \\ -\text{con} \end{array} \right] \end{array} \longrightarrow \begin{array}{c} \text{p}^{\text{h}}, \text{t}^{\text{h}}, \text{k}^{\text{h}} \\ [+asp] \end{array} \quad / \text{ \_\_\_\_\_\_ } \text{v}$$

The feature of aspiration, [+asp], is added here to specify the feature that separates allophones.

optional

$$(2) \begin{array}{c} \text{p} \\ \left[ \begin{array}{c} +\text{cns} \\ -\text{vd} \\ -\text{lab} \end{array} \right] \end{array} \longrightarrow \begin{array}{c} \text{f} \\ \left[ \begin{array}{c} +\text{std} \\ +\text{cor} \end{array} \right] \end{array} \quad / \text{ \_\_\_\_\_\_ } \left\{ \begin{array}{c} \# \\ \text{v} \end{array} \right\}$$

optional

$$(3) \begin{array}{c} \text{p, t, k} \\ \left[ \begin{array}{c} +\text{cns} \\ -\text{vd} \\ -\text{cont} \end{array} \right] \end{array} \longrightarrow \begin{array}{c} \text{p̚, t̚, k̚} \\ [+unrel] \end{array} \quad / \text{ \_\_\_\_\_\_ } \$$$

The (\$) signals syllable boundary. The feature unreleased is added here to specify the feature that distinguishes the unreleased allophones.

Phonemes /b/, /d/, /g/, and /gb/

The phones [b], [d], and [g] vary with [m̥b], [n̥d] and [ŋ̥g] word initially and intervocalically. Initially, prenasalisation occurs infrequently and is very short when it does occur. Intervocalically prenasalisation is still infrequent but the nasal may be as long as the stop.



optional

(5)  $\begin{bmatrix} +std \\ -vd \end{bmatrix} \longrightarrow \begin{bmatrix} -std \\ -cont \end{bmatrix} / \{ \# \} \underline{\quad} v$

/sari/	[saʔi]	come (imp.)
/mosikene/	[mosikene]	you will plant (something)
/tatse/	[tatse]	our (dl.) older brother
/zizi/	[zizi] ~ [dzidzi]	watermelon
/belakamze/	[belakamze]	tongue

Phonemes /l/ and /r/

The voiced alveolar lateral [l] and voiced alveolar flap [ɾ] occur word initially and intervocally.

/lom/	[lom]	hole
/ŋole/	[ŋole]	his younger brother
/rarapko/	[ʔaʔapko]	afternoon

## 4.2. Description of vowel phonemes

The vowels with the feature [-bac], /i/, /e/, and /a/, are environmentally sensitive. Table D describes the phonetic detail of the vocoids.

			Front		Central		Back	
			unrd.	rd.	unrd.	rd.	unrd.	rd.
vd.	High	Close Open	i ɪ					u ɯ
	Mid	Close Open	e ɛ					o
	Low	Close Open	æ		a			

Phoneme /i/

The voiced high close front unrounded phone [i] varies freely with the high-open front unrounded phone [ɪ] in simple vowel nuclei contiguous to a following nasal. Elsewhere the phone [i] occurs.

optional

$$(6) \begin{array}{c} i \\ \text{[+syl]} \\ \text{+hi} \\ \text{-bac} \\ \text{+tns} \end{array} \longrightarrow \begin{array}{c} \text{[ -tns]} \\ / \text{ \_\_\_\_\_\_ } \text{[+nas]} \end{array}$$

/ginikale/	[ginikale]	~	[ginikale]	<i>I will give it to you</i>
/ikop/	[ikop]			<i>now</i>
/biana/	[biana]			<i>flying fox</i>
/nei/	[nei]			<i>man</i>
/momoine/	[momoine]			<i>cold</i>

Phoneme /i/

The voiced high close back rounded non-syllabic vocoid [i] has no allophonic variation.

Phoneme /e/

The voiced mid-open front unrounded vocoid [ɛ] occurs between consonants in simple vowel nuclei and word initially. The voiced mid-close front unrounded vocoid [e] occurs in all vowel sequences and word final.

$$(7) \begin{array}{c} e \\ \text{[+syl]} \\ \text{-hi} \\ \text{-lo} \\ \text{-bac} \end{array} \longrightarrow \begin{array}{c} \text{[ -tns]} \\ / \{ \# \} \text{ \_\_\_\_\_\_ } \text{C} \end{array}$$

/emen/	[ɛmɛn]	<i>louse</i>
/gaemaıke/	[gaemaıke]	<i>it burns you</i>
/eu/	[eɟ]	<i>garden</i>
/arimageake/	[arimageake]	<i>he will always go</i>

Phoneme /a/

The voiced low-open central unrounded vocoid [a] varies with the voiced low, close front unrounded vocoid [æ] in simple vowel nuclei contiguous to alveolar and dental consonants. Elsewhere only [a] occurs.

optional

$$(8) \begin{array}{c} a \\ \text{[+syl]} \\ \text{+lo} \\ \text{-bac} \\ \text{-tns} \end{array} \longrightarrow \begin{array}{c} \text{[+tns]} \\ / \text{ \_\_\_\_\_\_ } \text{[+cor]} \end{array}$$

/manmaike/	[mænma <sub>ɨ</sub> ke]	~ [manma <sub>ɨ</sub> ke]	he gives it
/oŋaŋa/	[oŋaŋa]		shadow, picture
/dapotpi/	[dæpot <sub>ɨ</sub> pi]	~ [dapot <sub>ɨ</sub> pi]	you (pl.) read it

## Phoneme /o/

The voiced mid-close back rounded vocoid [o] has no allophonic variation.

/onoka/	[onoka]	what?
/ruo/	[ʁuo]	night
/boŋ/	[boŋ]	later

## Phoneme /u/

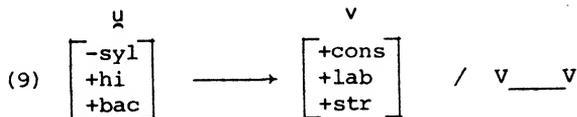
The voiced high-close back rounded vocoid [u] has no allophonic variation

/ukude/	[ukude]	today
/qauk/	[qauk]	banana
/ruo/	[ʁuo]	night
/ariu/	[aʁiu]	you (pl.) will go

## Phoneme /ɯ/

The voiced high-close back rounded non-syllabic vocoid [ɯ] varies with the labio-dental voiced fricative [v] intervocalically. Word initially only [u] occurs.

optional



/uikin/	[uikin]		pain
/kaiue/	[kai <sub>ɯ</sub> e]	~ [kai <sub>v</sub> e]	sun
/moiaua/	[mo <sub>ɯ</sub> a <sub>ɯ</sub> a]	~ [mo <sub>v</sub> a <sub>v</sub> a]	enough