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**Title:** A grammar of Papuan Malay

**Issue Date:** 2014-06-03

## 2. Phonology

Papuan Malay has 18 consonant phonemes and a basic five-vowel system. The consonant system consists of six stops, two affricates, two fricatives, four nasals, two liquids, and two approximants. The vowel system includes two front and two back vowels, and one open central vowel. Papuan Malay shows a clear preference for disyllabic roots and for CV and CVC syllables; the maximal syllable is CCVC. Stress typically falls on the penultimate syllable, although lexical roots with ultimate stress are also attested.

The description of Papuan Malay phonology is based on a word list of 1,116 lexical roots plus 381 items, historically derived by (unproductive) affixation (for details about the word list, see §1.8.6). The native consonant and vowel phoneme inventories are presented in §2.1. The phonological changes that the consonant and vowel segments can undergo are discussed in §2.2. A number of surface phenomena are described in §2.3. The phonotactics of Papuan Malay are investigated in §2.4, including a discussion of the segment distribution and possible sequences, syllable structures, and stress patterns. As already mentioned in §1.8.6, the corpus also includes a large number of loan words; so far 718 items of the 2,458-item word list (29%) have been identified. Papuan Malay has also adopted one loan segment, the voiceless labio-dental fricative /f/, and developed three substitution strategies to realize another non-native segment, the voiceless postalveolar fricative /ʃ/. The non-native segments and loan words are discussed in §2.5. Given the rather large percentage of loan words, this discussion is rather detailed, including a description of the phonological and phonetic processes and the phonotactics attested in loan words.

This chapter closes with an account of the orthographic conventions used in this grammar in §2.6 and a summary in §2.7.<sup>54</sup>

### 2.1. Segment inventory

The Papuan Malay consonant system is presented in §2.1.1, and the vowel system in §2.1.2.

#### 2.1.1. Consonant system

##### 2.1.1.1. Consonant inventory

Papuan Malay has 18 consonant phonemes, shown in Table 1. The system consists of three pairs of stops, one pair of affricates, four nasals, two fricatives, two liquids, and two approximants.

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<sup>54</sup> Two important sources for the description of the Papuan Malay phonology are Donohue (to be published) and Sutri Narfahan and Donohue (under review).

Table 1: Papuan Malay consonant inventory

	LAB	ALV	PAL-ALV	PAL	VEL	GLOT
STOP	p b	t d			k g	
AFFR			tʃ dʒ			
NAS	m	n		ɲ	ŋ	
FRIC		s				h
RHOT		r				
LAT-APR		l				
APR				j	w	

The 18 phonemes and their realizations are presented in Table 2. The rhotic has three allophones; the phonological and phonetic processes involved in their variation are discussed in §2.2.2 and §2.3.1.3, respectively. The voiceless stops are typically unreleased in the coda position. However, when occurring in the word-final coda position before a pause, they can be slightly released.

Table 2: Papuan Malay stops

Phoneme	Realization
Stop	<p>/p/ [p], a voiceless bilabial stop [p̚], an unreleased voiceless bilabial stop</p> <p>/b/ [b], a voiced bilabial stop</p> <p>/t/ [t], a voiceless alveolar stop [t̚], an unreleased voiceless alveolar stop</p> <p>/d/ [d], a voiced alveolar stop</p> <p>/k/ [k], a voiceless velar stop [k̚], an unreleased voiceless velar stop</p> <p>/g/ [g], a voiced velar stop</p>
Affricate	<p>/tʃ/ [tʃ], a voiceless postalveolar affricate</p> <p>/dʒ/ [dʒ], a voiced postalveolar affricate</p>
Nasal	<p>/m/ [m], a voiced bilabial nasal</p> <p>/n/ [n], a voiced alveolar nasal</p> <p>/ɲ/ [ɲ], a voiced palatal nasal</p> <p>/ŋ/ [ŋ], a voiced velar nasal</p>
Fricative	<p>/s/ [s], a voiceless alveolar fricative</p> <p>/h/ [h], a voiceless glottal fricative</p>
Liquid	<p>/r/ [r], a voiced alveolar trill [r̥], a voiceless alveolar trill [r̩], a voiced alveolar tap</p> <p>/l/ [l], a voiced alveolar lateral</p>

Phoneme	Realization
Approximant /j/	[j], a voiced palatal approximant
/w/	[w], a voiced labio-velar approximant

### 2.1.1.2. Contrast between similar consonants

Contrast between similar consonants is presented in minimal or near-minimal pairs in the following tables: in word-initial position in Table 3, in root-internal position in Table 4, and in word-final position in Table 5. When (near-)minimal pairs could not be found, another word containing a contrasting consonant is given. Some segments have a restricted distribution; the palatal nasal, for instance, does not occur in the coda position (§2.4.1).

Table 3: Consonant contrast in word-initial position

Contrast	Item	Orthogr.	Gloss	
p~b~m	[ <sup>1</sup> pu.lu]	<i>pulu</i>	‘tens’	
	[ <sup>1</sup> bu.lu]	<i>bulu</i>	‘body hair’	
	[ <sup>1</sup> mu.lot <sup>1</sup> ]	<i>mulut</i>	‘mouth’	
t~d~n	t~d	[ <sup>1</sup> tɔŋ]	<i>tong</i>	‘1PL’
		[ <sup>1</sup> dɔŋ]	<i>dong</i>	‘3PL’
	t~n	[ <sup>1</sup> ti.ker]	<i>tikar</i>	‘plaited mat’
		[ <sup>1</sup> ni.ka]	<i>nika</i>	‘marry officially’
	d~n	[ <sup>1</sup> dɛ.ket <sup>1</sup> ]	<i>dekat</i>	‘near’
		[ <sup>1</sup> nɛ.ket <sup>1</sup> ]	<i>nekat</i>	‘be determined’
k~g	[ <sup>1</sup> ka.ja]	<i>kaya</i>	‘like’	
	[ <sup>1</sup> ga.ja]	<i>gaya</i>	‘manner’	
tʃ~dʒ~t/d	tʃ~dʒ	[ <sup>1</sup> tʃu.rɛŋ]	<i>curang</i>	‘be dishonest’
		[ <sup>1</sup> dʒu.rɛŋ]	<i>jurang</i>	‘steep decline’
	tʃ~t	[ <sup>1</sup> tsem.por]	<i>campur</i>	‘mix’
		[ <sup>1</sup> tem.per]	<i>tampar</i>	‘beat’
	dʒ~d	[ <sup>1</sup> dʒa.ri]	<i>jari</i>	‘digit’
		[ <sup>1</sup> da.ri]	<i>dari</i>	‘from’
s~h	[ <sup>1</sup> sen.tɛŋ]	<i>santang</i>	‘coconut milk’	
	[ <sup>1</sup> hen.tem]	<i>hantam</i>	‘strike’	
m~n~ɲ	m~n	[ <sup>1</sup> ma.si]	<i>masi</i>	‘still’
		[ <sup>1</sup> na.si]	<i>nasi</i>	‘cooked rice’
	m~ɲ	[ <sup>1</sup> mɛ.mɛŋ]	<i>memang</i>	‘indeed’
		[ <sup>1</sup> na.mɛŋ]	<i>nyamang</i>	‘be comfortable’

Contrast	Item	Orthogr.	Gloss
n~ɲ	[ <sup>1</sup> na.keɭ]	<i>nakal</i>	‘be mischievous’
	[ <sup>1</sup> ɲa.wa]	<i>nyawa</i>	‘soul’
l~r	[ <sup>1</sup> ra.wɛŋ]	<i>rawang</i>	‘be haunted’
	[ <sup>1</sup> la.wɛŋ]	<i>lawang</i>	‘oppose’
j~ɲ	[ <sup>1</sup> jɛŋ]	<i>yang</i>	‘REL’
	[ <sup>1</sup> ɲa.wa]	<i>nyawa</i>	‘soul’
j~w	[ <sup>1</sup> jɛŋ]	<i>yang</i>	‘REL’
	[ <sup>1</sup> wa.ruŋ]	<i>warung</i>	‘food stall’

Table 4: Consonant contrast in root-internal position

Contrast	Item	Orthogr.	Gloss	
p~b~m	p~b	[ <sup>1</sup> ke.poŋ]	<i>kepong</i>	‘surround’
		[ <sup>1</sup> ke.boŋ]	<i>kebung</i>	‘garden’
	p~m	[ <sup>1</sup> ra.pi]	<i>rapi</i>	‘be neat’
		[ <sup>1</sup> ra.mɛ]	<i>rame</i>	‘be bustling’
	b~m	[ <sup>1</sup> su.boɾ]	<i>subur</i>	‘be fertile’
		[ <sup>1</sup> su.muɾ]	<i>sumur</i>	‘(a) well’
t~d~n	t~d	[ <sup>1</sup> hi.tuŋ]	<i>hitung</i>	‘count’
		[ <sup>1</sup> hi.duŋ]	<i>hidung</i>	‘nose’
	t~n	[ <sup>1</sup> bu.tu]	<i>butu</i>	‘need’
		[ <sup>1</sup> bu.nu]	<i>bunu</i>	‘kill’
	d~n	[ <sup>1</sup> a.de]	<i>ade</i>	‘younger sibling’
		[ <sup>1</sup> a.ne]	<i>ane</i>	‘be strange’
k~g~ŋ	[ <sup>1</sup> la.ki]	<i>laki</i>	‘man’	
	[ <sup>1</sup> la.gi]	<i>lagi</i>	‘again’	
	[ <sup>1</sup> la.ŋit <sup>ˀ</sup> ]	<i>langit</i>	‘sky’	
tʃ~dʒ~t/d	tʃ~dʒ	[ <sup>1</sup> ben.tʃi]	<i>banci</i>	‘homosexual male’
		[ <sup>1</sup> ben.dʒɪɾ]	<i>banjir</i>	‘flood’
	tʃ~t	[ <sup>1</sup> tʃa.tʃɛt <sup>ˀ</sup> ]	<i>cacat</i>	‘be disabled’
		[ <sup>1</sup> tʃa.tɛt <sup>ˀ</sup> ]	<i>catat</i>	‘make a note’
	dʒ~d	[ <sup>1</sup> tun.dʒok <sup>ˀ</sup> ]	<i>tunjuk</i>	‘show’
		[ <sup>1</sup> tun.dok <sup>ˀ</sup> ]	<i>tunduk</i>	‘bow’
s~h	[ <sup>1</sup> pa.sɪɾ]	<i>pasir</i>	‘sand’	
	[ <sup>1</sup> pa.hɪt <sup>ˀ</sup> ]	<i>pahit</i>	‘be bitter’	

Contrast	Item	Orthogr.	Gloss
m~n~ɲ~ŋ	m~n	['mɛ.mɛŋ]	<i>memang</i> 'indeed'
		[mɛ.'nɛŋ]	<i>menang</i> 'win'
	m~ɲ	['ta.mu]	<i>tamu</i> 'guest'
		['ta.ɲa]	<i>tanya</i> 'ask'
	m~ŋ	['la.mɛr]	<i>lamar</i> 'apply for'
		['la.ŋɛr]	<i>langar</i> 'collide with'
	n~ɲ~ŋ	['ta.nɛm]	<i>tanam</i> 'plant'
		['ta.ɲa]	<i>tanya</i> 'ask'
		['ta.ŋɛŋ]	<i>tangang</i> 'hand'
l~r	['bu.lu]	<i>bulu</i> 'body hair'	
	['bu.ru]	<i>buru</i> 'hunt'	
j~ɲ	['a.jɛm]	<i>ayam</i> 'chicken'	
	['a.ɲɛm]	<i>anyam</i> 'plait'	
j~w	['la.jɛŋ]	<i>layang</i> 'serve'	
	['la.wɛŋ]	<i>lawang</i> 'oppose'	
w~ŋ	['ba.wɛŋ]	<i>bawang</i> 'onion'	
	['ba.ŋɔŋ]	<i>bangung</i> 'wake up'	

Table 5: Consonant contrast in word-final position

Contrast	Item	Orthogr.	Gloss
PLOS~NASAL	p~m	['a.sɛpʔ]	<i>asap</i> 'smoke'
		['a.sɛm]	<i>asam</i> 'sour'
	t~ŋ	['bu.ɛt]	<i>buat</i> 'make'
		['bu.ɛŋ]	<i>buang</i> 'discard'
	k~ŋ	['dʒa.rɛk]	<i>jarak</i> 'distance between'
		['dʒa.rɛŋ]	<i>jarang</i> 'rarely'
l~r	['mɛn.dɔl]	<i>mandul</i> 'be sterile'	
	['mɔn.dɔr]	<i>mundur</i> 'smoke'	
j~w	['tɛj]	<i>tay</i> 'excrement'	
	['tɛj]	<i>taw</i> 'know'	

## 2.1.2. Vowel system

### 2.1.2.1. Vowel inventory

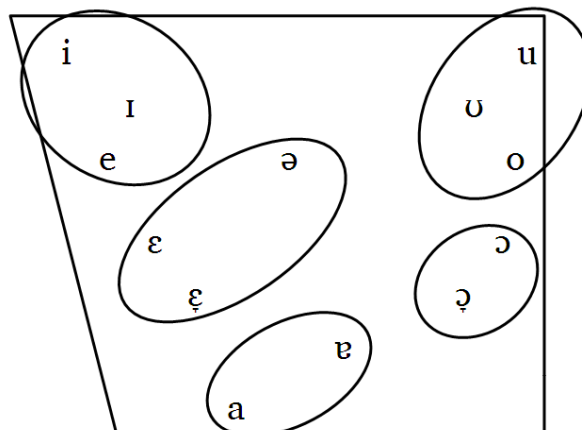
The Papuan Malay vowel inventory, presented in Table 6, consists of two front and two back vowels, and one open central vowel.

Table 6: Papuan Malay vowel inventory

	FRONT	CENTRAL	BACK
CLOSE	i		u
OPEN-MID	ɛ		ɔ
OPEN		a	

Three of the five vowels have three allophones each: /i/ can be realized as [i], [ɪ], or [e], /u/ as [u], [ʊ], or [o], and /ɛ/ as [ɛ], [ɛ̟], or [ə]. The remaining two vowels have two allophones each: /ɔ/ can be realized as [ɔ] or [ɔ̟], and /a/ as [a] or [ɐ].<sup>55</sup> While the centralized allophones for the two close vowels /i/ and /u/ and for the open vowel /a/ are represented with distinct entries in the IPA chart, this is not the case for the open-mid vowels /ɛ/ and /ɔ/. In terms of their degree of openness, their centralized allophones [ɛ̟] and [ɔ̟] are distinctly lower than their non-centralized allophones [ɛ] and [ɔ]. They are higher, however, than the respective open-near vowels /æ/ and /ɒ/ found in other languages, as described in the “IPA chart” (International Phonetic Association 2005; see also SIL International 1996–2008). Hence, as they lie in-between the open-mid and open-near vowels, these two allophones are represented as [ɛ̟] and [ɔ̟]. Chart 1 presents the vowel space for the five vowels and their allophones.<sup>56</sup>

Chart 1: Vowel space for the Papuan Malay vowels



<sup>55</sup> The diacritic “̟” signals that the vowel is lowered.

<sup>56</sup> The vowel space in Chart 1 is based on the author’s impressions rather than on measured spectrographic data.

The phonological processes involved in the allophonic variation of the Papuan Malay vowels are discussed in §2.2.

### 2.1.2.2. Contrast between the vowel segments

Contrast between the five vowel segments in disyllabic lexical items is presented in minimal or near-minimal pairs in the following tables: in open stressed penultimate syllables in Table 7, in closed stressed penultimate syllables in Table 8, and in open unstressed ultimate syllables in Table 9. When minimal or near-minimal pairs could not be found, another word containing a contrasting vowel segment is given.

Table 7: Vowel contrast in open stressed penultimate syllables

Contrast	Item	Orthogr.	Gloss
i~e	[ <sup>1</sup> i.koʔ]	<b>ikut</b>	‘follow’
	[ <sup>1</sup> ε.kɔʔ]	<b>ekor</b>	‘tail’
i~a	[ <sup>1</sup> i.ŋɪŋ]	<b>inging</b>	‘wish’
	[ <sup>1</sup> a.ŋɪŋ]	<b>anging</b>	‘wind’
i~u	[ <sup>1</sup> i.ris]	<b>iris</b>	‘cut’
	[ <sup>1</sup> u.rus]	<b>urus</b>	‘arrange’
i~ɔ	[ <sup>1</sup> i.tu]	<b>itu</b>	‘D.DIST’
	[ <sup>1</sup> ɔ.tɔʔ]	<b>otot</b>	‘muscle’
ε~a	[ <sup>1</sup> ε.dʒɛkʔ]	<b>ejek</b>	‘mock’
	[ <sup>1</sup> a.dʒɛk]	<b>ajak</b>	‘invite’
ε~u	[ <sup>1</sup> ε.kɔʔ]	<b>ekor</b>	‘tail’
	[ <sup>1</sup> u.kur]	<b>ukur</b>	‘measure’
ε~ɔ	[ <sup>1</sup> ε.dʒɛkʔ]	<b>ejek</b>	‘mock’
	[ <sup>1</sup> ɔ.dʒɛkʔ]	<b>ojek</b>	‘motorbike taxi’
a~u	[ <sup>1</sup> a.ra]	<b>ara</b>	‘direction’
	[ <sup>1</sup> u.rɛʔ]	<b>urat</b>	‘vein’
u~ɔ	[ <sup>1</sup> u.dʒɔŋ]	<b>ujung</b>	‘end’
	[ <sup>1</sup> ɔ.dʒɛkʔ]	<b>ojek</b>	‘motorbike taxi’

Table 8: Vowel contrast in closed stressed penultimate syllables

Contrast	Item	Orthogr.	Gloss
i~u	[ <sup>1</sup> min.ta]	<b>mintā</b>	‘request’
	[ <sup>1</sup> mon.ta]	<b>muntā</b>	‘vomit’
i~e	[ <sup>1</sup> tɪm.bɛŋ]	<b>timbang</b>	‘weigh’
	[ <sup>1</sup> tɛm.bekʔ]	<b>tembak</b>	‘shoot’

Contrast	Item	Orthogr.	Gloss
i~a	[ <sup>1</sup> tɪm.ba]	<i>timba</i>	‘fetch’
	[ <sup>1</sup> təm.ba]	<i>tamba</i>	‘add’
i~ɔ	[ <sup>1</sup> tɪŋ.ket <sup>1</sup> ]	<i>tingkat</i>	‘level’
	[ <sup>1</sup> tɔŋ.ket <sup>1</sup> ]	<i>tongkat</i>	‘cane’
ɛ~a	[ <sup>1</sup> sɛn.tu]	<i>sentu</i>	‘touch’
	[ <sup>1</sup> sən.te]	<i>sante</i>	‘relax’
ɛ~u	[ <sup>1</sup> tɛm.bək <sup>1</sup> ]	<i>tembak</i>	‘shoot’
	[ <sup>1</sup> tɔm.buk <sup>1</sup> ]	<i>tumbuk</i>	‘pound’
ɛ~ɔ	[ <sup>1</sup> bɛŋ.kək <sup>1</sup> ]	<i>bengkok</i>	‘be crooked’
	[ <sup>1</sup> bɔŋ.kək <sup>1</sup> ]	<i>bongkok</i>	‘be bent over’
a~u	[ <sup>1</sup> bən.tu]	<i>bantu</i>	‘help’
	[ <sup>1</sup> bun.tu]	<i>buntu</i>	‘be blocked’
a~ɔ	[ <sup>1</sup> səm.buŋ]	<i>sambung</i>	‘continue’
	[ <sup>1</sup> sɔm.bɔŋ]	<i>sombong</i>	‘be arrogant’
u~ɔ	[ <sup>1</sup> səm.buŋ]	<i>sumbang</i>	‘donate’
	[ <sup>1</sup> sɔm.bɔŋ]	<i>sombong</i>	‘be arrogant’

Table 9: Vowel contrast in open unstressed syllables

Contrast	Item	Orthogr.	Gloss
i~ɛ	[ <sup>1</sup> pɛ.lɛ]	<i>pele</i>	‘cover’
	[ <sup>1</sup> pi.li]	<i>pili</i>	‘choose’
i~a	[ <sup>1</sup> ka.li]	<i>kali</i>	‘river’
	[ <sup>1</sup> ka.la]	<i>kala</i>	‘be defeated’
i~u	[ <sup>1</sup> la.gi]	<i>lagi</i>	‘again’
	[ <sup>1</sup> la.gu]	<i>lagu</i>	‘song’
i~ɔ	[ <sup>1</sup> ba.bi]	<i>kali</i>	‘river’
	[ <sup>1</sup> bɔ.bɔ]	<i>bobo</i>	‘palm liquor’
ɛ~u	[ <sup>1</sup> pɑ.kɛ]	<i>pake</i>	‘use’
	[ <sup>1</sup> pɑ.ku]	<i>paku</i>	‘nail’
ɛ~ɔ	[ <sup>1</sup> gɑ.lɛ]	<i>gale</i>	‘dig up’
	[ <sup>1</sup> gɑ.rɔ]	<i>garo</i>	‘scratch’
a~u	[ <sup>1</sup> bi.sa]	<i>bisa</i>	‘be capable’
	[ <sup>1</sup> bi.su]	<i>bisu</i>	‘mute’

Contrast	Item	Orthogr.	Gloss
u~ɔ	[ <sup>1</sup> tu.bu]	<i>tubu</i>	‘body’
	[ <sup>1</sup> tɔ.bɔ]	<i>tobo</i>	‘dive’

## 2.2. Phonological processes

In Papuan Malay, two phonological processes are attested for the consonants and one for the vowels: nasal place assimilation (§2.2.1), tap/trill alternation of the alveolar rhotic (§2.2.2), and centralization of vowels (§2.2.3).

### 2.2.1. Nasal place assimilation

Nasal place assimilation applies to nasals as coda in the domain of the prosodic word. While all four nasals occur in the onset position (although velar /ŋ/ only occurs in the word-internal onset position), only two nasals occur as coda, namely bilabial /m/ and velar /ŋ/, as shown in Table 10. The velar nasal as a coda assimilates in place of articulation to a following stop or affricate. When preceding the alveolar fricative, the nasal is always realized as velar [ŋ], as in *bongso* ‘youngest offspring’ or *langsung* ‘immediately’. These patterns agree with Padgett’s (1994: 489) cross-linguistic findings that nasals either do “not assimilate in place to fricatives” or that such assimilation is, at least, “highly disfavored, while assimilation to stops and affricates is pervasive”. (See also de Lacy 2006: 146–147, Zsiga 2006: 554 and Blust 2012.) An exception to these patterns of nasal assimilation is the prefix *PE(N)-* ‘AG’ (§3.1.4). When preceding the alveolar fricative /s/, the nasal is not realized as alveolar [n] but as palatal [ɲ], as in *penyakit* [pɛŋ-sakit] ‘disease’, with /s/ being deleted (see also Blust 2012).

Cross-linguistically, the preservation of the bilabial nasal is not unusual, as de Lacy (2006: 78–207) points out. It is due to the fact, that on the “Place of Articulation” hierarchy, the labial nasal is more marked than the dental or velar (2006: 129). Such marked elements “can be specifically targeted for preservation. Consequently, highly marked elements can survive a process that less-marked elements undergo” (2006: 146).

Table 10: Nasal place assimilation in the word-internal coda position

Phoneme	Realization	Item	Orthogr.	Gloss
/m/	[m]	[ <sup>1</sup> sim.pɛŋ]	<i>simpang</i>	‘store’
		[kɛm. <sup>1</sup> ba.li]	<i>kembali</i>	‘return’
/ŋ/	[ŋ]	[ <sup>1</sup> mɪn.ta]	<i>mintā</i>	‘ask’
		[ <sup>1</sup> mɛn.di]	<i>mandi</i>	‘bathe’
		[ <sup>1</sup> hɛn.tʃɔr]	<i>hancur</i>	‘be shattered’
		[ <sup>1</sup> m.dʒɛk <sup>ʔ</sup> ]	<i>injak</i>	‘step on’

Phoneme	Realization	Item	Orthogr.	Gloss
	[ŋ]	['eŋ.ketʰ]	<i>angkat</i>	'pick-up'
		['tɪŋ.gi]	<i>tinggi</i>	'be tall'
		['bɔŋ.sɔ]	<i>bongso</i>	'youngest offspring'
		['leŋ.suŋ]	<i>langsung</i>	'immediately'

Nasal place assimilation also occurs across word boundaries, when the nasal is in the word-final coda position, as shown in Table 11. While bilabial /m/ is preserved, velar /ŋ/ assimilates in place of articulation to a following stop or affricate, similar to the processes illustrated in Table 10. When preceding a fricative-initial or vowel-initial word, or when occurring before a pause or at the end of an utterance, by contrast, the velar nasal is most commonly realized as velar [ŋ]. In Table 11, this is illustrated with *minum* 'drink', *biking* 'make' and *bilang* 'say'. Overall, however, assimilation across word boundaries is applied less often than within the prosodic word.

Table 11: Nasal place assimilation in the word-final coda position

Phoneme	Item	Orthogr.	Gloss
/m/	['mi.nɔm 'bɔ.bɔ]	<i>minum bobo</i>	'drink schnapps'
	['mi.nɔm 'du.lu]	<i>minum dulu</i>	'drink first'
	[... 'mi.nɔm 'ki.'tɔŋ]	<i>... minum kitong</i>	'(give) us to drink'
	['mi.nɔm 'i.tu]	<i>minum itu</i>	'drink that'
	['mi.nɔm, 'ta.pi]	<i>minum, tapi</i>	'drink, but'
/ŋ/	['bi.kɪm 'ba.gus]	<i>biking bagus</i>	'make good'
	['bi.kɪm 'di.a]	<i>biking dia</i>	'make him/her'
	['bi.kɪŋ 'kɔ.tɔr]	<i>biking kotor</i>	'make dirty'
	['bi.kɪŋ 'sa]	<i>biking sa</i>	'make me'
	['bi.kɪŋ 'a.pa]	<i>biking apa</i>	'make what'
	['bi.kɪŋ, 'mɛ.mɛŋ]	<i>biking, memang</i>	'make, indeed'
/ŋ/	['bi.lɛm 'ba.pa]	<i>bilang bapa</i>	'tell father'
	['bi.lɛn 'di.a]	<i>bilang dia</i>	'tell him/her'
	['bi.lɛŋ 'ka.ka]	<i>bilang kaka</i>	'tell older sibling'
	['bi.lɛŋ 'sa.ma]	<i>bilang sama</i>	'say to'
	['bi.lɛŋ 'i.ni]	<i>bilang ini</i>	'say this'
	['bi.lɛŋ, 'blɔm]	<i>bilang, blum</i>	'say, not yet'

In summary, the data presented in Table 10 and Table 11 show that Papuan Malay has only two underlying nasals in the coda position, namely bilabial /m/ and velar /ŋ/, with the latter assimilating to a following stop or affricate.

### 2.2.2. Tap/trill alternation of the alveolar rhotic

The rhotic /r/ is most commonly realized as the voiced alveolar trill [r]. In intervocalic position, however, the rhotic is realized as the voiced tap [ɾ] as illustrated in (1) and Table 12. In the C<sub>2</sub> position in CC clusters, the rhotic is also most commonly realized as the voiced trill [r]. The voiced tap, however, is also quite common in this position.

- (1) ta pake ... garəəəm sɾej ritʃaaa ... daŋɪ ini  
 1PL take salt lemongrass red pepper meat D.PROX  
 saja asar dia kase krɪŋ di parapara  
 1SG smoke 3SG give be.dry at platform  
 ‘we used ... **salt, lemongrass, red pepper**, ... this (pig) meat, I **smoked** it  
 (and) **dried** (it) on a **platform**’ [080919-004-NP.0037-0038]

Table 12: Tap/trill alternation of rhotic /r/

Realization	Item	Orthogr.	Gloss
[r]	[ <sup>1</sup> ra.kus]	<i>rakus</i>	‘be greedy’
	[ <sup>1</sup> kri.ŋet <sup>1</sup> ]	<i>kringat</i>	‘sweat’
	[ <sup>1</sup> mɔr.ni]	<i>murni</i>	‘be pure’
	[ <sup>1</sup> dʒɛŋ.krɪk <sup>1</sup> ]	<i>jangkrik</i>	‘cricket’
[ɾ]	[ <sup>1</sup> ba.rɛŋ]	<i>barang</i>	‘stuff’
	[ <sup>1</sup> gɔ.rɛŋ]	<i>goreng</i>	‘fry’
	[ <sup>1</sup> u.rus]	<i>urus</i>	‘arrange’

### 2.2.3. Centralization of vowels

In closed syllables the five vowels are centralized. Close /i/ is centralized to [ɪ] and /u/ to [ʊ], open-mid /ɛ/ is centralized to [ɛ̃] and /ɔ/ to [ɔ̃], and open /a/ is centralized to [ə̃], as illustrated in Table 13. In unstressed closed syllables with a coda nasal, open-mid /ɛ/ can alternatively be centralized to [ə̃] rather than to [ɛ̃].

Table 13: Vowel centralization in closed syllables

Phoneme	Realization	Item	Orthogr.	Gloss
/i/	[ɪ]	[ <sup>1</sup> tɪŋ.gi]	<i>tinggi</i>	‘be high’
		[pɛn. <sup>1</sup> tɪŋ]	<i>penting</i>	‘be important’
/u/	[ʊ]	[ <sup>1</sup> bʊŋ.kus]	<i>bungkus</i>	‘pack’
		[ <sup>1</sup> i.kʊt <sup>1</sup> ]	<i>ikut</i>	‘follow’

Phoneme	Realization	Item	Orthogr.	Gloss
/ɛ/	[ɛ]	[ <sup>1</sup> gɛn.dɔŋ]	<i>gendong</i>	‘hold’
		[ <sup>1</sup> dɔ.ŋɛŋ]	<i>dongeng</i>	‘legend’
	[ə]	[əm.ˈpət̚]	<i>empat</i>	‘four’
		[səɱ.ˈbi.ləŋ]	<i>sembilang</i>	‘nine’
/ɔ/	[ɔ]	[ <sup>1</sup> lɔm.ba]	<i>lomba</i>	‘contest’
		[ <sup>1</sup> bɛ.lɔk̚]	<i>belok</i>	‘turn’
/a/	[ɐ]	[ <sup>1</sup> ɛn.dʒɪŋ]	<i>anjing</i>	‘dog’
		[ <sup>1</sup> bɪm.tɛŋ]	<i>bintang</i>	‘star’

### 2.3. Phonetic processes

In Papuan Malay, a number of phonetic processes occur in addition to the predictable phonological processes described in §2.2. These surface phenomena involve unpredictable variation. For the consonants, the following phenomena are attested: lenition of the stops and the voiced affricates as well as fortition of the voiceless affricate and the palatal approximant (§2.3.1.1), elision of the voiceless stops, the alveolar fricative, the velar nasal, and the liquids (§2.3.1.2), and devoicing of the alveolar rhotic (§2.3.1.3). The vowels can undergo the following phonetic processes: centralization and lowering (§2.3.2.1), nasalization (§2.3.2.2), and lengthening (§2.3.2.3). In addition, this section includes a discussion on alternative realizations of the VS sequences /aj/ and /aw/ (§2.3.3)

#### 2.3.1. Phonetic processes for consonants

##### 2.3.1.1. Lenition and fortition

Lenition, or weakening, is attested for the stops and affricates and can occur in word-internal inter-vocalic position, and word-initial position. Fortition, or strengthening, occurs very rarely and is only attested for the voiceless affricate and the palatal approximant as word-initial onset.

Inter-vocalically, the stops and the voiced affricate can be lenited by means of spirantization to fricatives, as illustrated in Table 14: /p/ is lenited to [ɸ], /b/ to [β], /d/ to [ð], /k/ to [x], /g/ to [ɣ], and /dʒ/ to [j]. This process does not, however, apply to the voiceless (post)alveolar segments. The voiceless affricate /tʃ/ can be lenited to the palatal approximant [j], while lenition of alveolar /t/ is unattested.

Table 14: Lenition of stops and affricates in word-internal inter-vocalic position

Phoneme	Item	Orthogr.	Gloss
/p/	['ba.ɸa]	<i>bapa</i>	'father'
/b/	['sa.βer]	<i>sabar</i>	'be patient'
/d/	['su.ða]	<i>suda</i>	'already'
/k/	['ma.xeŋ]	<i>makang</i>	'eat'
/g/	['ba.ɣi]	<i>bagi</i>	'divide'
/dʒ/	['sa.ʒa]	<i>saja</i>	'just'
/tʃ/	['pa.jɛ]	<i>pace</i>	'man'

Most of the stops and the voiced affricate can also be lenited in word-initial position when following a word with final vowel. In this environment, however, lenition of the voiced affricate occurs less often than lenition of the stops. Inter-vocally across word-boundaries, the word-initial obstruents are lenited to the same fricatives as word-internally, as shown in Table 15. Also, /p/ can be lenited to [f], and /d/ and /dʒ/ can be lenited to [j]. Word-initial lenition to a fricative is also attested for /b/, /d/, and /k/ when following a nasal. In this environment, /d/ can also be lenited to [n]. Again, lenition to a fricative does not apply to the voiceless (post)alveolar segments. Neither is lenition in word-initial position attested for /g/.<sup>57</sup>

Table 15: Lenition of stops and affricates in word-initial position

Phoneme	Item	Orthogr.	Gloss
/p/	['de ɸu]	<i>de pu</i> 3SG POSS	'his (grandson)'
	['di.a 'fluŋ.ku]	<i>dia palungku</i> 3SG punch	'he punched'
/b/	['je 'βi.lɛŋ]	<i>de bilang</i> 3SG say	'he/she said'
	['dʒa.rɪm 'βɔ.lɛ]	<i>jaring bole</i> net may	(the) net (is) permitted

<sup>57</sup> One lexical item in particular undergoes lenition of its word-initial stop: the long and the short forms of the third person singular pronoun, *dia/de* '3SG'. Onset /d/ can be lenited to [j] when following a lexical item with a voiceless stop, the alveolar fricative /s/, or the rhotic /r/ in word-final coda position.

Phoneme	Item	Orthogr.	Gloss
/d/	[m'la, ε 'ðɛpʰ]	<i>mulay, eh dep</i> start uh 3SG:POSS	'(he) started, uh his'
	[sa.dʒa jɛ.ŋɛŋ]	<i>saja dengang</i> just with	'just with'
	[spul 'ba.ðɛn 'ði]	<i>spul badan di</i> wash body at	'wash (your) body in'
	[ki.tɔŋ 'nu.a]	<i>kitong dua</i> 1PL two	'we two'
/k/	[a.dɛ.'xa.xa]	<i>ade-kaka</i> ySb oSb	'siblings'
	[dɛ.ŋɛŋ 'xa.xa]	<i>dengang kaka</i> with oSb	'with (the) older sibling'
/dʒ/	[sa pu 'jɛ.kɛtʰ]	<i>sa pu jeket</i> 1SG POSS jacket	'my jacket'
	[... 'i.tu, 'ja.ŋɛŋ]	<i>... itu, jangang</i> D.DIST NEG.IMP	'those (big ones), don't'

Fortition occurs very rarely and is attested only for the voiceless affricate and the palatal approximant in word-initial position. In the more thoroughly transcribed 150-minute extract of the present corpus, fortition of /tʃ/ is attested once and strengthening of /j/ twice, as shown in Table 16.

Table 16: Fortition of the voiceless affricate and the voiced palatal approximant

Phoneme	Item	Orthogr.	Gloss
/tʃ/	[dɛpʰ 'tu.tʃu]	<i>de pu cucu</i> 3SG POSS grandchild	'his grandchild'
/j/	[ej 'dʒɛŋ be.,sɛr~be.'sɛr]	<i>ey yang besar~besar</i> hey REL RDP~be.big	hey those big (ones)
	[ja]	<i>yo</i> yes	'yes'

### 2.3.1.2. Elision

Elision of a word-final segment is attested for the voiceless stops, the alveolar fricative, the velar nasal, and both liquids, as shown in Table 17. Concerning the voiceless stops, elision applies most frequently to /k/. Elision of /t/ occurs less frequently and is unattested for /p/. Word-final /s/ is much less prone to elision than word-final stops, with the corpus containing only two lexical items with deleted /s/. As for the nasals, elision is attested only for velar /ŋ/. When omitted, the nasal is

always realized as nasalization on the preceding vowel.<sup>58</sup> Elision of the liquids occurs only very rarely. The exception is *ambil* ‘fetch’. Of its 221 tokens, 49 tokens are realized without word-final /l/: [‘əm.bi] (48 tokens) and [‘əm.be.a] (1 token).

Table 17: Elision of the voiceless stops, the alveolar fricative, the velar nasal, and the liquids in word-final position

Phoneme	Item	Orthogr.	Gloss
/t/	[‘sa.ki]	<i>sakit</i>	‘be sick’
/k/	[‘ma.sa]	<i>masak</i>	‘cook’
/s/	[‘tru]	<i>trus</i>	‘be continuous’
/ŋ/	[‘ən.dʒɪ]	<i>anjing</i>	‘dog’
/r/	[‘la.pa]	<i>lapar</i>	‘be hungry’
/l/	[‘əm.bi / ‘əm.be.a]	<i>ambil</i>	‘fetch’

### 2.3.1.3. Devoicing

Devoicing applies only to the rhotic trill as word-final coda. In this position, it is most commonly realized as [r]. Before a pause or in utterance-final position, however, the trill can also be devoiced to [ɾ], as illustrated in (2).

- (2) **skaren** dɔŋ kasi dɪa **sɛntɛɾ**, kasi **sɛntɛɾ** dɔŋ kasi piɔw  
 now 3PL give 3SG flashlight give flashlight 3PL give knife  
 ‘**now** they give him a **flashlight**, (having) given (him) a **flashlight** they give (him) a knife’ [081108-003-JR.0002]

### 2.3.1.4. Palatalization

Palatalization of /s/ is rare. It occurs only in lexical roots with a /si.V/ sequence, if this root has three or more syllables and if the syllable containing /s/ is unstressed. The palatalization of /s/ co-occurs with the elision of the close front vowel /i/, which reduces the number of syllables by one, as illustrated in Table 18. Hence, /si.V/ is realized as [sʲV]. Attested is one polysyllabic lexical root with a /si.V/ sequence, the high frequency item *siapa* ‘who’. In lexical roots with a /si.V/ sequence in which the syllable containing /s/ is stressed, palatalization of the fricative does not occur. Attested are the three lexical roots listed in Table 18, all of which are disyllabic: *sial* ‘be unfortunate’, *siang* ‘midday’, and *siap* ‘be ready’.

This lack of assimilation in stressed syllables does, however, also apply to lexical items with more than two syllables, as evidenced by three polysyllabic loan words, presented in §2.5.2.3. The occurrence of /s/ in a /si.V/ sequence together with

<sup>58</sup> More in-depth acoustic phonetic analysis is needed to determine whether the nasalized vowels remain centralized. Since these vowels occur in open syllables they are represented as their non-centralized allophones (for more details see §2.2.3) pending further results.

the stress pattern of the respective lexical item does not, however, condition the palatalization of the fricative. This is evidenced by the fact that *siapa* ‘who’ is realized quite commonly without palatalization: [‘sa.pa].

The frequency counts in Table 18 are based on the broad transcription of the entire 16-hour corpus (16-H-C) and the more thoroughly transcribed 150-minute extract (150-M-C) of the present corpus.<sup>59</sup>

Table 18: Palatalization of the alveolar fricative in loan words

Stress	Orthogr.	Gloss	Realization	Freq. 16-H-C	Freq. 150-M-C
/si/ unstressed	<i>siapa</i>	‘who’	[si.‘a.pa]	196	---
			[‘s‘a.pa]	---	40
			[‘sa.pa]	115	10
/‘si/ stressed	<i>sial</i>	‘be unfortunate’	[‘si.ɐl]	1	1
	<i>siang</i>	‘midday’	[‘si.ɐŋ]	55	6
	<i>siap</i>	‘be ready’	[‘si.ɐp̚]	54	2

### 2.3.2. Phonetic processes for vowels

#### 2.3.2.1. Centralization and lowering

In addition to the regular decentralization of the vowels in closed syllables, the data indicates two environments where centralization of vowels occurs on an irregular basis in open syllables: (1) under the influence of central vowel /a/, and (2) under the influence of the corresponding centralized allophone occurring in closed syllables. In addition, the close vowels are very commonly lowered in fast speech.

In open syllables, the close and open-mid vowels are frequently centralized under the influence of the central vowel /a/, similar to the process of centralization in closed syllables (§2.2.3) In unstressed open syllables, open-mid /ɛ/ can alternatively be centralized to [ə] rather than to [ɛ̃].

<sup>59</sup> The broad transcription of the 16-hour corpus makes no distinction between the unpalatalized and the palatalized realizations of *siapa* ‘who’, [si.‘a.pa] and [‘s‘a.pa], respectively. Hence, a more thorough transcription of all 196 /siapa/ tokens is required to establish whether speakers sometimes realize the interrogative as the trisyllabic item [si.‘a.pa] or whether they always palatalize the fricative and thereby realize the item as disyllabic [‘s‘a.pa]. In the more thoroughly transcribed 150-minute extract of the present corpus the trisyllabic *siapa* [si.‘a.pa] ‘who’ is unattested.

Table 19: Vowel centralization under the influence of central vowel /a/<sup>60</sup>

Phoneme	Realization	Item	Orthogr.	Gloss
/i/	[ɪ]	[ <sup>1</sup> dɪ.a]	<i>dia</i>	‘3SG’
		[ <sup>1</sup> hɪ.ləŋ]	<i>hilang</i>	‘be lost’
/u/	[ʊ]	[ <sup>1</sup> lʊ.əs]	<i>luas</i>	‘be vast’
		[ <sup>1</sup> bʊ.kəŋ]	<i>bukang</i>	‘NEG’
/ɛ/	[ɛ]	[ <sup>1</sup> bɛ.ra]	<i>bera</i>	‘defecate’
		[ <sup>1</sup> hɛ.la]	<i>hela</i>	‘haul’
	[ə]	[bə.'kəs]	<i>bekas</i>	‘trace’
		[lə.'pəs]	<i>lepas</i>	‘free’
/ɔ/	[ɔ]	[ <sup>1</sup> hɔ.sa]	<i>hosa</i>	‘pant’
		[ <sup>1</sup> kɔ.ləm]	<i>kolam</i>	‘big hole’

In open syllables the close and open-mid vowels can also be centralized under the influence of the corresponding centralized allophone occurring in a closed syllable, as illustrated in Table 20 (see also §2.2.3).

Table 20: Vowel centralization harmony<sup>61</sup>

Phoneme	Environment	Item	Orthogr.	Gloss
/i/	[ɪ] in open SYLB preceded by [ɪC]	[prɔ.'pɪn.sɪ]	<i>propinsi</i>	‘province’
		[ <sup>1</sup> skɪp'.sɪ]	<i>skripsi</i>	‘minithesis’
	[ɪ] in open SYLB followed by [ɪC]	[ <sup>1</sup> mɪ.rɪŋ]	<i>miring</i>	‘be sideways’
		[ <sup>1</sup> gɪ.lɪŋ]	<i>giling</i>	‘grind’
/u/	[ʊ] in open SYLB preceded by [ʊC]	[ <sup>1</sup> bʊm.bʊ]	<i>bumbu</i>	‘bamboo’
		[ <sup>1</sup> bʊn.tʊ]	<i>buntu</i>	‘be blocked’
	[ʊ] in open SYLB followed by [ʊC]	[ <sup>1</sup> lʊ.rʊs]	<i>lurus</i>	‘be straight’
		[ <sup>1</sup> tʊ.rʊŋ]	<i>turung</i>	‘descend’
/ɛ/	[ɛ] in open SYLB preceded by [ɛC]	[bɛr.'tɛ.mu]	<i>bertemu</i>	‘be friends’
		[,bɛr.kɛ.'bʊŋ]	<i>berkebung</i>	‘do farming’
	[ɛ] in open SYLB followed by [ɛC]	[ <sup>1</sup> ɛ.pɛŋ]	<i>epeng</i>	‘important’
		[mɛ.'lɛ.sɛt']	<i>meleset</i>	‘miss a target’

<sup>60</sup> The following lexemes are loan words: *rotan* ‘rattan’ and *soal* ‘problem’.

<sup>61</sup> The following lexemes are loan words: *propinsi* ‘province’ and *skripsi* ‘minithesis’. The following lexemes historically derived by (non-productive) affixation: *bertemu* ‘be friends’, *berkebung* ‘farm’, and *meleset* ‘miss a target’.

Phoneme	Environment	Item	Orthogr.	Gloss
/ɔ/	[ɔ] in open SYLB preceded by [ɔC]	['bɔŋ.sɔ]	<i>bongso</i>	‘youngest child’
		['tʃɔn.tɔ]	<i>conto</i>	‘example’
	[ɔ] in open SYLB followed by [ɔC]	['rɔ.kɔkʰ]	<i>rokok</i>	‘cigarette’
		['kɔ.dɔkʰ]	<i>kodok</i>	‘frog’

In fast speech, the close vowels /i/ and /u/ are very commonly lowered and realized as the close-mid vowels [e] and [o] respectively, as demonstrated in (3) to (6). In (3) the verb *kasi* ‘give’ is realized as [‘ka.se], and in (4) the verb *balik* ‘turn around’ is realized as [‘ba.le].<sup>62</sup> In (5) the numeral *dua* ‘two’ is realized as [‘do.a] and in (6) the common noun *lubang* ‘hole’ is realized as [‘lo.bəŋ]

- (3) ... mɔ bikɪn papɛda mɔ kase anana maken  
want 3PL sagu.porridge want give RDP~child eat  
‘[they said (they) wanted to catch chickens and then] (they) wanted to make sagu porridge to **give** the children to eat’ [081010-001-Cv.0191]
- (4) itu Bop Bop itu, de biasa bale  
D.DIST Bop Bop D.DIST 3SG be.usual turn.around  
‘that was Bob, that Bob, he usually (**flies**) **a circle**’ (Lit. ‘turns around’) [081011-010-Cv.0019]
- (5) skarɛn dɔŋ doa mɛn.tʃɪŋ  
now 3PL two fish  
‘now the **two** of them are fishing’ [081109-010-JR.0002]
- (6) dɛ masuk lobɛŋ tu  
3SG enter hole D.DIST  
‘it (‘the chicken’) went into that **hole** (in the floor)’ [080921-004a-CvNP.0096]

### 2.3.2.2. Nasalization

The five vowels /i, u, ɛ, ɔ, a/ can be nasalized and realized as [ĩ, ũ, ẽ, õ, ã] as a result of the elision of the word-final velar nasal /ŋ/, discussed in §2.3.1.2.

Table 21: Nasalization of the vowels

Phoneme	Item	Orthogr.	Gloss
/i/	['ɛn.dʒĩ]	<i>anjing</i>	‘dog’
/u/	['laŋ.sũ]	<i>langsung</i>	‘immediately’
/ɛ/	['dẽ]	<i>deng(ang)</i>	‘with’
/ɔ/	[dõ]	<i>dong</i>	‘3PL’
/a/	[bilã]	<i>bilang</i>	‘say’

<sup>62</sup> Concerning the elision of the word-final stop see §2.3.1.2.

### 2.3.2.3. Lengthening

Vowel length is not phonemic in Papuan Malay. Very commonly, however, vowel lengthening occurs as a manifestation of emphasis, as in (7) and (8). In (7) the speaker relates how, after a long journey, they finally got to their destination *sampee di pohong* ‘all the way up to the tree’. In (8), an irritated mother explains to her son for the nth time that their date of departure has *beluum* ‘not yet’ come.

- (7) kitɔŋ dua turon **sempe::** di pɔhɔŋ  
 1PL two descend arrive at tree  
 ‘we two came down ALL THE WAY to the tree’ [080917-008-NP.0024]
- (8) itu **belu::m**, tɔŋ blum dʒalen  
 D.DIST not.yet 1PL not.yet walk  
 ‘that’s NOT YET, we’re not going yet’ [080921-001-CvNP.0007]

### 2.3.3. **Alternative realizations of the VC sequences /aj/ and /aw/**

The VC sequences /aj/ and /aw/ have alternative realizations on an irregular basis. They tend to be centralized to [ɛj] and [ɔw], respectively, as shown in Table 22, or they can be reduced to the open-mid vowels [ɛ] and [ɔ], respectively, as illustrated in Table 23 and Table 24.

When /aj/ and /aw/ occur in disyllabic roots, they tend to be centralized to [ɛj] and [ɔw], respectively, in the following environments (see Table 22). The VC sequence /aj/ is centralized to [ɛj] when following a liquid, as in *serey* [sɛ.ʳɛj] ‘lemongrass’ or *laley* [ʰla.lɛj] ‘be careless’.<sup>63</sup> With other onset consonants /aj/ remains unaffected. As for the centralization of /aw/ to [ɔw], the data is less clear. Attested are only three lexical items: /au/ is centralized to [ɔw] following the lateral /l/ in *pulow* [ʰpu.lɔw] ‘island’, the affricate /dʒ/ in *hijow* [ʰhi.dʒɔw] ‘green’, and the fricative /s/ in *pisow* [ʰpi.sɔw] ‘knife’. With other onset consonants /aw/ is not centralized. More data is needed to explore whether centralization in these contexts is indeed unpredictable or whether it constitutes a predictable phonological process.<sup>64</sup>

<sup>63</sup> All ten participants in a rapid orthography test, by contrast, realized *laley* ‘be careless’ as [ʰla.lɛj] and not as [ʰla.lɛj].

<sup>64</sup> The corpus includes only eight lexical roots containing /aj/ and ten roots with /aw/.

Table 22: Realization of /aj/ as [ɛj] and of /aw/ as [ɔw]

Phoneme	Realization	Item		Gloss
/aj/	[ɛj] vs. [ɛ]	[tʃe.'rɛj]	<i>cerey</i>	'divorce'
		['la.lɛj]	<i>laley</i>	'be careless'
		[sɛ.'rɛj]	<i>serey</i>	'lemongrass'
		['da.mɛj]	<i>damay</i>	'peace'
		['tu.pɛj]	<i>tupay</i>	'squirrel'
/aw/	[ɐw] vs. [ɔw]	['hi.dʒɔw]	<i>hijow</i>	'green'
		['pi.sɔw]	<i>pisow</i>	'knife'
		['pu.lɔw]	<i>pulow</i>	'island'
		['hi.rɛw]	<i>hiraw</i>	'heed'
		['ki.tʃɐw]	<i>kicaw</i>	'be naughty'

When /aj/ and /aw/ occur in unstressed CVC syllables of non-monosyllabic roots, they tend to be reduced to open-mid vowels under the influence of the central vowel /a/; that is, /aj/ is realized as front /ɛ/, and /aw/ as back /ɔ/.

The tendency to realize /aj/ as [ɛ] applies especially to unstressed CVC syllables with an onset stop, as shown in Table 23. In this environment, the realization of /aj/ as [ɛj] occurs much less often or not at all. Examples are *cape* 'be tired' or *pake* 'use'. The VC sequence typically remains unaffected in the following environments: in unstressed CVC syllables with an initial consonant other than a stop, as in *damay* 'peace', when preceded by a syllable containing a vowel other than central /a/, as in *pegaway* 'employee', or in stressed syllables as in *selesay* 'finish'.

Table 23: Realization of /aj/ as [ɛj] or [ɛ]

[ɛj]		[ɛ]		Orthogr.	Gloss
Item	Freq.	Item	Freq.		
['tʃa.pɛj]	1	['tʃa.pɛ]	23	<i>cape</i>	'be tired'
--- <sup>65</sup>	---	['pa.kɛ]	213	<i>pake</i>	'use'
['sɛn.tɛj]	1	['sɛn.tɛ]	7	<i>sante</i>	'relax'
['da.mɛj]	9	---	---	<i>damay</i>	'peace'
[pɛ.'ga.wɛj]	110	[pɛ.'ga.wɛ]	3	<i>pegaway</i>	'employee'
[sɛ.lɛ.'sɛj]	154	---	---	<i>selesay</i>	'finish'
['su.ŋɛj]	6	---	---	<i>sungay</i>	'river'
['tu.pɛj]	1	---	---	<i>tupay</i>	'squirrel'

The tendency to realize /aw/ as [ɔ] also applies to unstressed syllables with an onset consonant. This consonant, however, does not need to be a stop, as shown in Table

<sup>65</sup> Standard Malay realizes this lexical item as <*pakai*> 'use, wear' (Mintz 2002).

24. Examples are *dano* ‘lake’ and *kaco* ‘be confused’.<sup>66</sup> When preceded by a syllable containing a vowel other than central /a/, the VC sequence typically remains unaffected, and its realization as [ɔ] is rare, as in *hiraw* ‘heed’ and *pisow* ‘knife’. There is one exception, however, namely *pulow* ‘island’.

Table 24: Realization of /aw/ as [ɛw] or [ɔ]

[aw]		[ɔ]		Orthogr.	Gloss
Item	Freq.	Item	Freq.		
[ <i>'da.nɛw</i> ]	1	[ <i>'da.nɔ</i> ]	3	<i>dano</i>	‘lake’
[ <i>'ka.tʃɛw</i> ]	2	[ <i>'ka.tʃɔ</i> ]	12	<i>kaco</i>	‘be confused’
[ <i>'hi.dʒɛw</i> ]	1	---	---	<i>hijow</i>	‘be green’
[ <i>'hi.rɛw</i> ]	2	---	---	<i>hiraw</i>	‘heed’
[ <i>'ki.tʃɛw</i> ]	1	---	---	<i>kicaw</i>	‘be naughty’
[ <i>'pu.lɛw</i> ]	7	[ <i>'pu.lɔ</i> ]	5	<i>pulow</i>	‘island’
[ <i>'pis.ɛw</i> ]	5	---	---	<i>pisow</i>	‘knife’

In monosyllabic words, /aj/ and /aw/ are never realized as /ɛ/ and /ɔ/, respectively. Examples are *tay* /taj/ ‘excrement’ and *taw* /taw/ ‘know’. There is one exception, though, monosyllabic *mo* ‘want’. In the present corpus this item is typically realized as /mɔ/ (750 tokens), rather than as /maw/ (212). In the historically affixed lexical items *kemawang* ‘will’ and *mawnya* ‘the wanting’, however, the root is realized as /maw/, as the syllable containing the root is stressed.

## 2.4. Phonotactics

This section describes how in Papuan Malay segments combine to form syllables, how syllables combine into words, and what the stress patterns of these words are. The distribution and sequences of the consonant phonemes are presented in §2.4.1 and those of the vowel phonemes in section §2.4.2. The syllable structures are described in §2.4.3 and the stress patterns in §2.4.4.

For all of the identified segment sequences, as well as for most of the syllable types and stress patterns, the attested lexical items were investigated as to whether they are inherited Malay roots or loan words, by using the following sources: Jones (2007) and Tadmor (2009).<sup>67</sup> For high frequency syllable types and stress patterns, however, not all of the attested entries were checked. Hence, upon further investigation some of these lexical items may turn out to be loan words.

<sup>66</sup> In addition, the corpus also contains three loan words in which /aw/ is realized as /ɔ/:

(1) *ato* ‘or’: /*'a.tɔ*/ (113 tokens) vs. /*'a.taw*/ (85 tokens)  
 (2) *kalo* ‘if’: /*'ka.lɔ*/ (1,028 tokens) vs. /*'ka.law*/ (230 tokens)  
 (3) *sodara* ‘sibling’: /*sɔ.'da.ra*/ (138 tokens) vs. /*saw.'da.ra*/ (14 tokens).

<sup>67</sup> Additional input was provided by Blust (p.c. 2012), Clynes (p.c. 2012), Grimes (p.c. 2012), Mahdi (p.c. 2012), Mills (p.c. 2012), van den Berg (p.c. 2012), and Williams-van Klinken (p.c. 2012).

### 2.4.1. Consonant phoneme distribution and sequences

Table 25 provides an overview of the distribution of the consonant phonemes. All consonants occur in the onset position, both word-initially and word-internally, except for the velar nasal /ŋ/. While it occurs rather commonly in the word-internal onset position, it does not occur as word-initial onset.<sup>68</sup>

The range of consonants occurring as a coda is considerably smaller. The voiceless stops, fricative /s/, and the four sonorants (liquids and approximants) occur as coda, both word-internally and word-finally. By contrast, the following segments do not occur as coda, neither word-internally nor word-finally: the voiced stops, the affricates, and the glottal fricative.<sup>69</sup> As for the nasals, only bilabial /m/ and velar /ŋ/ occur as a word-internal or word-final coda, with the velar nasal assimilating to a following stop or affricate (§2.2.1).

Table 25: Distribution of the consonant phonemes

	STOP						AFFR		FRIC		NAS				LIQ		APR	
	p	b	t	d	k	g	tʃ	dʒ	s	h	m	n	ɲ	ŋ	r	l	j	w
ONSET	+	+	+	+	+	+	+	+	+	+	+	+	+	(+)	+	+	+	+
CODA	+	-	+	-	+	-	-	-	+	-	m	ŋ	ɲ	ŋ	+	+	+	+

A restricted sample of consonants can occur in onset CC clusters, as illustrated in Table 26. The range of consonants occurring in word-initial clusters is considerably larger than the range of consonants occurring in word-internal clusters.

Table 26: CC clusters – Examples

		Stops in C <sub>1</sub> position			
		Word-initial position		Word-internal position	
/pC <sub>2</sub> /	/p <sup>h</sup> raŋ/	‘war’			
	/p <sup>h</sup> laŋ/	‘be slow’			
/bC <sub>2</sub> /	/b <sup>h</sup> rat/	‘be heavy’	/bC <sub>2</sub> /	/t <sup>h</sup> a.brək/	‘hit against’
	/b <sup>h</sup> la.kəŋ/	‘back’		/t <sup>h</sup> ʃɔ.blɔs/	‘punch’
/tC <sub>2</sub> /	/t <sup>h</sup> raŋ/	‘be clear’			
	/t <sup>h</sup> lan.dʒəŋ/	‘be naked’			
/dC <sub>2</sub> /	/d <sup>h</sup> la.paŋ/	‘eight’	/dC <sub>2</sub> /	/gɔn.drɔŋ/	‘be long haired’
/tʃC <sub>2</sub> /	/tʃ <sup>h</sup> re.wət/	‘chatty’			

<sup>68</sup> This restricted phonotactic distribution of the velar nasal is cross-linguistically rather common. Following Anderson (2011: 7) it has to do with “word-edge” and “word-medial” phonotactics in general: “word-edge coda and onset positions seem to be more restricted than corresponding coda and onset positions in non-edge positions”.

<sup>69</sup> In the word-final coda position, the glottal fricative /h/ occurs only in interjections.

Stops in C <sub>1</sub> position					
Word-initial position			Word-internal position		
/kC <sub>2</sub> /	<b>/kna.pa/</b>	‘why’	/kC <sub>2</sub> /	<b>/dʒaŋ.krik/</b>	‘cricket’
	<b>/kriŋ/</b>	‘be dry’			
	<b>/kləm.pək/</b>	‘group’			
	<b>/kwali/</b>	‘frying pan’			
/gC <sub>2</sub> /	<b>/gnɛ.mə/</b>	‘melinjo tree’			
	<b>/glap/</b>	‘be dark’			
Fricatives in C <sub>1</sub> position					
/sC <sub>2</sub> /	<b>/sper.ti/</b>	‘like’	/sC <sub>2</sub> /	<b>/ka.'swa.ri/</b>	‘cassowary’
	<b>/ska.raŋ/</b>	‘now’			
	<b>/smut/</b>	‘ant’			
	<b>/snaŋ/</b>	‘be happy’			
	<b>/sriŋ/</b>	‘often’			
	<b>/sla.taŋ/</b>	‘south’			
	<b>/swak/</b>	‘be exhausted’			

Cross-linguistically, the creation of consonant clusters tends to be constrained and guided by the “Sonority Sequencing Principle that requires onsets to rise in sonority toward the nucleus” (Kenstowicz 1994: 254): vowels are the most sonorous, followed by glides, liquids, nasals, and obstruents. Following the Sonority Sequencing Principle, C<sub>1</sub> “may be added to the onset only if it is less sonorous” than C<sub>2</sub> (1994: 255). Hence, CC clusters are most commonly formed with an obstruent in C<sub>1</sub> position and a glide in C<sub>2</sub> position. The second most common are liquids or nasals occurring in C<sub>2</sub> position, while CC clusters with an obstruent in C<sub>2</sub> position are the least common. For the most part, the attested Papuan Malay CC clusters agree with the Sonority Sequencing Principle, as illustrated in Table 27: all CC clusters to the right of the bold line obey the Sonority Sequencing Principle. Only two clusters are attested that do not agree with this principle. They are found to the left of the bold line. Both clusters have alveolar /s/ in C<sub>1</sub> position and /p/ or /k/ in C<sub>2</sub> position.

All CC clusters listed in Table 27 occur as word-initial onset, while some of them are also found as word-internal onset. In Table 27 these clusters are underlined. Consonant sequences in the coda position do not occur. The data show a clear preference for CC clusters with the lateral /l/ in C<sub>2</sub> position (29 entries), followed by clusters with rhotic /r/ in C<sub>2</sub> position (18 entries). CC clusters with the velar approximant /w/ (4 entries) or a nasal (3 entries) in C<sub>2</sub> position are much less common. Clusters with a stop in C<sub>2</sub> position are even less common (2 entries).

Table 27: CC clusters – Overview

C <sub>1</sub> C <sub>2</sub>	OBSTR										NAS				LIQ		APR	
	p	b	t	d	tʃ	dʒ	k	g	s	h	m	n	ɲ	ŋ	r	l	j	w
OBSTR	p	b	t	d	tʃ	dʒ	k	g	s	h					pr	pl		
															<u>br</u>	<u>bl</u>		
															tr	tl		
															<u>dr</u>	<u>dl</u>		
															tʃr			
											kn				<u>kr</u>	kl		kw
											gn					gl		
	sp					sk					sm	sn			sr	sl		<u>sw</u>
NAS																		
LIQ																		
APR																		

#### 2.4.2. Vowel phoneme distribution and sequences

All five vowels occur in stressed and unstressed, open and closed syllables, as illustrated in Table 28.

Table 28: Distribution of vowels in stressed and unstressed syllables

Phoneme	Stressed open SYLB		Stressed closed SYLB	
/i/	/ˈbi.su/	‘be mute’	/ˈtim.ba/	‘fetch’
/u/	/ˈpu.ti/	‘be white’	/ˈmun.ta/	‘vomit’
/ɛ/	/ˈmɛ.ra/	‘be red’	/ˈsɛn.tu/	‘touch’
/ɔ/	/ˈgɔ.dɛ/	‘be fat’	/ˈlɔm.ba/	‘contest’
/a/	/ˈra.dʒu/	‘pout’	/ˈgaŋ.gu/	‘disturb’

Phoneme	Unstressed open SYLB	Unstressed closed SYLB
/i/	/ <sup>h</sup> ba.bi/ ‘pig’	/ <sup>h</sup> ma.nis/ ‘be sweet’
/u/	/ <sup>h</sup> ka.ju/ ‘wood’	/ <sup>h</sup> ta.kut/ ‘fear’
/ɛ/	/ <sup>h</sup> tʃa.pɛ/ ‘be tired’	/ <sup>h</sup> sɔ.bɛk/ ‘tear’
/ɔ/	/ <sup>h</sup> ga.rɔ/ ‘scratch’	/ <sup>h</sup> bɛ.sɔk/ ‘tomorrow’
/a/	/ <sup>h</sup> bu.ta/ ‘be blind’	/ <sup>h</sup> li.pat/ ‘fold’

A restricted set of vowel segments can occur in V.V vowel sequences, as shown in Table 29. As far as attested, two examples are given for each V.V sequence. The first has a /<sup>h</sup>(C)V.V/ stress pattern in which the syllable containing V<sub>1</sub> is stressed. The second example has a /CV.V/ stress pattern in which V<sub>2</sub> is stressed. Of the 51 lexical roots containing V.V sequences, 43 items (84%) have a /<sup>h</sup>(C)V.V/ stress pattern, while only eight items (16%) show a /CV.V/ stress pattern.<sup>70</sup>

Table 29: V.V sequences – Examples

V <sub>1</sub> .V <sub>2</sub>	Stress	Item	Gloss	Freq.
/i.u/	/ <sup>h</sup> Ci.u/	/ <sup>h</sup> tʃi.ɔm/	‘kiss’	2
/i.a/	/ <sup>h</sup> Ci.a/	/ <sup>h</sup> di.am/	‘be quiet’	12
	/Ci. <sup>h</sup> a/	/gi. <sup>h</sup> a.was/	‘guava’	4
/u.a/	/ <sup>h</sup> u.a/	/ <sup>h</sup> u.aŋ/	‘money’ <sup>72</sup>	1
	/ <sup>h</sup> Cu.a/	/ <sup>h</sup> bu.at/	‘make’	15
	/Cu. <sup>h</sup> a/	/bu. <sup>h</sup> a.ja/	‘crocodile’	4
/a.i/	/ <sup>h</sup> a.i/	/ <sup>h</sup> a.ir/	‘water’	1
	/ <sup>h</sup> Ca.i/	/ <sup>h</sup> ba.ik/	‘be good’	7
/a.u/	/ <sup>h</sup> Ca.u/	/ <sup>h</sup> da.uŋ/	‘leaf’	5

The attested V.V sequences with their frequencies are summarized in Table 30. This overview, together with the data presented in Table 29, shows that the V<sub>1</sub> position is typically taken by a close vowel (38/51 lexical roots – 74%), while the open central vowel (36/51 lexical roots – 71%) typically takes the V<sub>2</sub> position.

Table 30: V.V sequences and frequencies – Overview

V <sub>1</sub> .V <sub>2</sub>	i	u	a	Total		
i	---	0	i.u 2	i.a 16	18	
u	---	0	---	u.a 20	20	
a	a.i 8	a.u 5	---	---	0	13
Total	8	7	36	51		

<sup>70</sup> Very commonly, speakers realize a /i.V/ sequence with a brief transitional glide. Since this is an almost universal phenomenon, the transitional glide is not transcribed.

Following Parker's (2008: 60) "hierarchy of relative sonority", most of the Papuan Malay V.V sequences are sequences of rising sonority with the open vowel /a/ in V<sub>2</sub> position having higher sonority than the close vowels /i/ and /u/ in V<sub>1</sub> position (36/51 – 71%). There are two exceptions: first, the two lexical entries with an /i.u/ vowel sequence, with both vowels having the same relative sonority, and second, the 13 lexical roots with an /a.i/ or /a.u/ vowel sequence.

The remainder of this section discusses the analysis of the vowel combinations /ai/ and /au/ as the V.V sequences /a.i/ and /a.u/, or rather as the VC sequences /aj/ and /aw/, respectively. When /ai/ and /au/ occur in closed syllables, they are analyzed as the V.V sequences /a.i/ and /a.u/. The actual pronunciations of /ai/ and /au/ do not indicate, however, that they are V.V sequences. Examples are *baik* /'ba.ik/ 'be good' or *laut* /'la.ut/ 'ocean'. When /ai/ and /au/ occur at syllable boundaries, they are analyzed as the VC sequences /aj/ and /aw/, respectively. Examples are *damay* /'da.maj/ 'peace' and *baw* /'baw/ 'smell'. This analysis is based on phonological and prosodic evidence, that is, the distribution of the vowel and consonant phonemes, as well as the syllable structures and stress patterns.

The first piece of evidence to be discussed is the vowel phoneme distribution. The five vowels occur in stressed and unstressed, open and closed syllables, as shown in Table 28. If the vowel combinations /ai/ and /au/ were diphthongs, they should occur in the same contexts where the five vowels occur. This, however, is not the case, as demonstrated in Table 31. The putative diphthong /ai/ (or centralized [ɛɪ]) occurs in stressed and unstressed open syllables. As for closed syllables, however, /ai/ occurs only once in a stressed syllable while it is unattested in unstressed syllables. The distribution of the putative diphthong /au/ is even more restricted. In disyllabic roots, /au/ only occurs in unstressed open syllables. In addition, the corpus contains eight monosyllabic items with /au/: three open monosyllabic items such as ['tau] 'know' and five closed items such as ['daʊŋ] 'leaf'. The same distributional patterns apply to loan words.

Table 31: Distribution of the putative diphthongs /ai/ and /au/ in stressed and unstressed syllables

	Stressed open SYLB	Stressed closed SYLB
/ai/	[tʃɛ.'rɛɪ] 'divorce'	[mu.'dʒaɪr] 'tilapiine fish'
/au/	(['tau] 'know')	(['daʊŋ] 'leaf')
	Unstressed open SYLB	Unstressed closed SYLB
/ai/	['tu.pai] 'squirrel'	---
/au/	['ki.tʃau] 'be naughty'	---

This constraint against diphthongs in unstressed (and stressed) closed syllables supports the analysis of /ai/ and /au/ as VC combinations or vowel sequences, rather than as diphthongs. When /ai/ and /au/ occur at syllable boundaries, they are analyzed as VC combinations. Examples are *cerey* /tʃɛ.'rej/ 'divorce', *taw* /'taw/ 'know', *tupay* /'tu.paj/ 'squirrel', and *kicaw* /'ki.tʃaw/ 'be naughty'. When the second vowel, that is /i/ or /u/, occurs in a closed syllable, /ai/ and /au/ are analyzed

as vowel sequences. Examples are *mujair* /mu.'dʒa.ir/ ‘tilapiine fish’, and *daung* /'da.uŋ/ ‘leaf’.

The second piece of evidence is the consonant phoneme distribution (see also §2.4.1). As already mentioned, /ai/ and /au/ are analyzed as the VC sequences /aj/ and /aw/ respectively when they occur at syllable boundaries. If instead /ai/ and /au/ were analyzed as diphthongs, this would affect the consonant phoneme distribution, since in that case the two approximants /j/ and /w/ would only occur in the onset position of a syllable but not in the coda position. This distribution, however, does not agree with that of the other sonorants, given that the liquids and also the nasals, although not all of them, occur in both positions. The analysis of /ai/ and /au/ as /aj/ and /aw/ at syllable boundaries fills this gap. Given, however, that coda /j/ and /w/ do not freely follow all vowels but only /a/, this could be taken as evidence that /ai/ and /au/ are better analyzed as diphthongs.

The third piece of evidence has to do with syllable structures and stress patterns. Papuan Malay has a clear preference for disyllabic roots and CV(C) syllables (see §2.4.3), and stress typically falls on the penultimate syllable (see §2.4.4). The present corpus contains 26 lexical roots with an /ai/ or /au/ vowel combination. Of these, 13 are analyzed as VC combinations (eight /aj/ and five /aw/ combinations). The remaining 13 vowel combination are analyzed as vowel sequences (eight /a.i/ and five /a.u/ sequences). These 13 vowel sequences occur in lexical roots with penultimate stress; that is, /a/ belongs to the stressed penultimate syllable, while the close vowel belongs to the unstressed ultimate syllable. If these 13 sequences are analyzed as diphthongs instead, the syllable structure of the respective roots changes and 12 of them become monosyllabic. This increases the number of monosyllabic roots from 44 to 56, an increase of 27%. Such an increase, however, seems to be disproportionately high given the strong preference for disyllabic roots. With respect to the stress patterns, evidence comes from one lexical root and four (historically) affixed items. In the lexical root *mujair* /mu.'dʒa.ir/ ‘tilapiine fish’ stress falls on the preferred penultimate syllable. If /ai/ is analyzed as a diphthong, stress instead falls on the dispreferred ultimate syllable, [mu.'dʒair]. Further, as mentioned above, the actual pronunciation of the /ai/ or /au/ vowel combinations does not suggest that they are V.V sequences. This, however, does not apply to four (historically) affixed items with penultimate stress, presented in Table 32. In these items, the penultimate stress audibly breaks up the /ai/ and /au/ vowel combinations with the close vowel receiving stress. This is taken as evidence that in the four respective roots /ai/ and /au/ are V.V sequences rather than diphthongs.

Table 32: Vowel combinations /ai/ and /au/ in (historically) affixed items

(Historically) affixed items		Gloss	Roots	Gloss
<i>kebaikang</i>	[kɛ.ba.'i.kɛŋ]	‘goodness’	<i>baik</i>	/'ba.ik/ ‘be good’
<i>maingang</i>	[ma.'i.ŋɛŋ]	‘toy’	<i>maing</i>	/'ma.iŋ/ ‘play’
<i>lautang</i>	[la.'u.tɛŋ]	‘ocean’	<i>laut</i>	/'la.ut/ ‘sea’
<i>permaingang</i>	[pɛr.ma.'i.ŋɛŋ]	‘game’	<i>maing</i>	/'ma.iŋ/ ‘play’

Based on the evidence presented here, it is concluded that the analysis of the /ai/ and /au/ vowel combinations as VC combinations at syllable boundaries and as V.V sequences in closed syllables, is the most efficient one. At the same time it is acknowledged, however, that there is evidence supporting the analysis of /ai/ and /au/ as diphthongs.

In the literature on eastern Malay varieties there is also some discussion concerning the question of whether these varieties have diphthongs at all, or whether vowel combinations such as /ai/ and /au/ better be analyzed as sequences of distinct vowels. For a number of eastern Malay varieties, diphthongs have been posited. For North Moluccan / Ternate Malay, Litamahuputty (2012: 15) posits five diphthongs, /ai/, /ae/, /ao/, /oi/, and /ei/. In earlier studies on North Moluccan Malay, Voorhoeve (1983: 2) suggests five diphthongs, /ai/, /ae/, /au/, /ao/, and /oi/, while Taylor (1983: 17) adds a sixth diphthong, /ei/. For three other eastern Malay varieties, such vowel combinations have been analyzed as sequences of distinct vowels rather than as diphthongs, that is Ambon Malay (van Minde 1997: 24), Larantuka Malay (Paauw 2008: 105), and Manado Malay (Stoel 2005: 12).

### 2.4.3. Syllable structures

In Papuan Malay the minimal syllable and prosodic word consists of a single consonant and a single vowel. The maximal syllable is CCVC. Papuan Malay shows clear preference for disyllabic roots and for CV(C) syllables. In Table 33 to Table 36 the possible arrangements of C and V for mono- and polysyllabic roots are presented in more detail. For each type the number of occurrences is given plus one example. The investigation of the syllable structure is based on a 1,116-root word list, extracted from the above-mentioned 2,458-item list.

Monosyllabic roots, with their different arrangements of C and V, are presented in Table 33. All roots have an onset C(C), while monosyllabic roots with (onset) V do not exist. In addition, the data shows a clear preference for closed syllables: (C)CVC (33/44 entries – 75%).

Table 33: Monosyllabic roots (44 entries)

Syllable types	Count	Item	Gloss
CV <sup>71</sup>	8	/kɔ/	'2SG'
CVC	13	/lur/	'spy on'
CCV	3	/bli/	'buy'
CCVC	20	/glap/	'dark'

Roots with two syllables are the most common ones. The data shows a clear preference for syllables with onset C, as shown in Table 34. The most common roots are CV.CV(C) (615/1,003 entries – 61%) and CVC.CV(C) (222/1,003 entries –

<sup>71</sup> The corpus includes eight CV roots all of which are function words, that is pronouns, prepositions, or conjunctions.

22%), while roots with onset V are rare (86/1,003 entries – 9%). Roots with onset CC clusters are also rare (41/1,003 – 4%).<sup>72</sup>

Table 34: Disyllabic roots (1,003 items)

Syllable types	Count	Item	Gloss
V.VC	2	/ <sup>h</sup> a.ir/	‘water’
V.CV	15	/ <sup>h</sup> a.pi/	‘fire’
V.CVC	52	/ <sup>h</sup> i.kəŋ/	‘fish’
VC.CVC	17	/ <sup>h</sup> am.pas/	‘waste’
CV.V	4	/ <sup>h</sup> dua/	‘two’
CV.VC	35	/ <sup>h</sup> bu.at/	‘make’
CV.CV	223	/ <sup>h</sup> ba.bi/	‘pig’
CV.CVC	392	/ <sup>h</sup> gɔ.rəŋ/	‘fry’
CV.CCVC	3	/ <sup>h</sup> ta.brak/	‘hit against’
CVC.CV	60	/ <sup>h</sup> pan.tə/	‘coast’
CVC.CVC	162	/ <sup>h</sup> tum.buk/	‘pound’
CVC.CCVC	2	/ <sup>h</sup> dʒəŋ.krik/	‘cricket’
CCV.CV	11	/ <sup>h</sup> bra.ni/	‘be courageous’
CCV.CVC	14	/ <sup>h</sup> bla.kəŋ/	‘backside’
CCVC.CV	5	/ <sup>h</sup> klam.bu/	‘mosquito net’
CCVC.CVC	6	/ <sup>h</sup> gləm.baŋ/	‘wave’

Trisyllabic roots with their possible arrangements of C and V are presented in Table 35. Again, the data shows a clear preference for syllables with onset C. The most common roots are CV.CV.CV(C) (40/67 entries – 60%) and CVC.CV.CV(C) (15/67 entries – 22%).<sup>73</sup> Roots with an onset CC clusters are, with one entry, very rare.

<sup>72</sup> The second item displaying a V.VC syllable structure is *uang* ‘money’. In Jones (2007), *uang* ‘money’ is not listed as a loan word, whereas Tadmor (2009) classifies it as a “probably borrowed”. The second item with a CVC.CCVC syllable structure is *gondrong* ‘be long haired’.

<sup>73</sup> Three of the syllable types presented in Table 35 are attested only once. However, none of these items are listed as a loan in Jones (2007). Nor could other literature sources be found that would identify them as loan words. The second item displaying a CV.V.CVC syllable structure is *kecualli* ‘except’, and the second item with a CV.CVC.CV syllable structure is *kaswari* ‘cassowary’.

Table 35: Trisyllabic roots (67 items)

Syllable types	Count	Item	Gloss
CV.V.CV	5	/bu.'a.ja/	'crocodile'
CV.V.CVC	2	/ti.'a.rap/	'lie face downward'
CV.CV.VC	1	/mu.'dʒa.ir/	'tilapiine fish'
CV.CV.CV	14	/tɛ.'li.ŋa/	'ear'
CV.CV.CVC	26	/be.'la.laŋ/	'grasshopper'
CV.CVC.CV	2	/pa.'luŋ.ku/	'punch'
CV.CVC.CVC	1	/,gɛ.mɛn.'tar/	'tremble'
CVC.CV.CV	9	/sɛn.'di.ri/	'be alone'
CVC.CV.CVC	6	/tam.'pɛ.lɛŋ/	'slap on face or ears'
CCVC.CV.VC	1	/prɛm.'pu.aŋ/	'woman'

Quadrissyllabic roots are presented in Table 36. With only two entries, they are extremely rare.<sup>74</sup> Again, the attested data show a preference for CV.

Table 36: Quadrissyllabic roots (2 items)

Syllable types	Count	Item	Gloss
V.CV.CV.CV	1	/,ɔ.la.'ra.ga/	'do sports'
CV.CV.V.CV	1	/,kɛ.tʃu.'a.li/	'except'

The data presented in Table 33 to Table 36 shows that Papuan Malay has a clear preference for disyllabic roots. Roots with one or three syllables are considerably less common, while quadrissyllabic roots are rare. Table 37 presents a frequency count for the mono- and polysyllabic roots.

Table 37: Frequencies of mono- and polysyllabic roots

Syllable types	Count	%
Monosyllabic	44	3.9%
Disyllabic	1,003	89.9%
Trisyllabic	67	6.0%
Quadrissyllabic	2	0.2%
Total	1,116	100%

The data presented in Table 33 to Table 36 also indicates that Papuan Malay has a preference for CV(C) syllables, with the maximal syllable being (C)CVC. With these “modest expansions of the simple CV syllable type”, Papuan Malay displays a “moderately complex syllable structure” which is “by far the most common type”

<sup>74</sup> Neither item is listed as a loan in Jones (2007). In addition, Clynes (p.c. 2012) and Mahdi (p.c. 2012) maintain that both items are morphologically indivisible Malay roots.

cross-linguistically, following Maddieson's (2011b: 4) typology of syllable structure.

In his analysis, Maddieson (2011b: 5) also observes an areal overlap and a significant, albeit not strong, correlation between consonant inventories and syllable structure:

... languages with simple canonical syllable structure have an average of 19.1 consonants in their inventory, languages with moderately complex syllable structure have an average of 22.0 consonants, and those with complex syllable structures have an average of 25.8 consonants.

Hence, given its consonant inventory with 18 segments, one would expect Papuan Malay to have a simple rather than a moderately complex canonical structure.

#### 2.4.4. Stress patterns

In Papuan Malay, primary stress typically falls on the penultimate syllable of the lexical root, while secondary stress is assigned to the alternating syllable preceding the one carrying the primary stress. These stress patterns apply to lexical roots (§2.4.4.1) as well as to lexical items that are historically derived by (unproductive) affixation (§2.4.4.2).

##### 2.4.4.1. Stress patterns for lexical roots

The basic stress patterns for di-, tri-, and quadrisyllabic lexical roots are illustrated in Table 38 to Table 40. The basis for this investigation forms the above-mentioned word list with 1,116 lexical roots.

Most disyllabic roots have penultimate stress (899/1,003 items – 90%), as illustrated in Table 38. The remaining 104 items (10%) have ultimate stress and display the following pattern. In 101 of the 104 roots (97%), the unstressed penultimate syllable contains the front open-near vowel /ɛ/. In the remaining three lexical roots, the unstressed penultimate syllable contains a close vowel (one item with front /i/ and two items with back /u/).<sup>75</sup> Front open-near /ɛ/, however, does not condition ultimate stress, as in 61 of the 899 lexical roots with penultimate stress (7%) the stressed syllable also contains front /ɛ/.

<sup>75</sup> The three items are: *kitong* /ki.'tɔŋ/ '1PL', *kumur* /ku.'mur/ 'rinse mouth', and *kuskus* /kus.'kus/ 'cuscus'.

Table 38: Stress patterns for disyllabic lexical roots (1,003 items)

Stress	Item	Orthogr.	Gloss
P-ULT	/ʰu.aŋ/	<b>uang</b>	‘money’ <sup>72</sup>
	/ʰa.pi/	<b>api</b>	‘fire’
	/ʰi.kaŋ/	<b>ikang</b>	‘fish’
	/ʰbu.at/	<b>buat</b>	‘make’
	/ʰba.bi/	<b>babi</b>	‘pig’
	/ʰgɔ.rɛŋ/	<b>goreng</b>	‘fry’
	/ʰtum.buk/	<b>tumbuk</b>	‘pound’
	/ʰbla.kaŋ/	<b>blakang</b>	‘backside’
ULT	/ɛ.ʰnam/	<b>enam</b>	‘six’
	/ɛm.ʰpat/	<b>empat</b>	‘four’
	/pɛ.ʰnu/	<b>penu</b>	‘be full’
	/ku.ʰmur/	<b>kumur</b>	‘rinse mouth’
	/rɛn.ʰda/	<b>renda</b>	‘be low’
	/dʒɛm.ʰpɔl/	<b>jempol</b>	‘thumb’

Examples of trisyllabic words with penultimate and ultimate stress are presented in Table 39. Most trisyllabic roots have penultimate stress (63/67 items – 94%) while only four lexical roots (6%) have ultimate stress. Again, a pattern similar to that for disyllabic lexical roots emerges. In all four roots, the unstressed penultimate syllable contains the front open-near vowel /ɛ/. As in disyllabic roots, however, front open-near /ɛ/ does not condition ultimate stress, as in four of the 63 lexical roots with penultimate stress (6%) the stressed syllable contains front /ɛ/.<sup>76</sup>

Table 39: Stress patterns for trisyllabic lexical roots (66 items)

Stress	Item	Orthogr.	Gloss
P-ULT	/bu.ʰa.ja/	<b>buaya</b>	‘crocodile’
	/ti.ʰa.rap/	<b>tiarap</b>	‘tiarap’
	/mu.ʰdʒa.ir/	<b>mujair</b>	‘tilapiine fish’
	/te.ʰli.ŋa/	<b>telinga</b>	‘ear’
	/be.ʰla.laŋ/	<b>belalang</b>	‘grasshopper’
	/tam.ʰpɛ.lɛŋ/	<b>tampeleng</b>	‘slap in face’
	/prem.ʰpu.aŋ/	<b>prempuang</b>	‘woman’

<sup>76</sup> The four items are: *papeda* [pa.ʰpɛ.da] ‘sagu porridge’, *padede* /pa.ʰdɛ.dɛ/ ‘whine’, *tampeleng* /tam.ʰpɛ.lɛŋ/ ‘slap in face’, and *wewenang* /we.ʰwɛ.naŋ/ ‘authority’.

Stress	Item	Orthogr.	Gloss
ULT	/pɛ.lɛ.'pa/	<i>pelepa</i>	'palm stem/midrib'
	/sɛ.lɛ.'saj/	<i>selesay</i>	'finish'
	/gɛ.mɛn.'tar/	<i>gementar</i>	'tremble'
	/tɛŋ.gɛ.'lam/	<i>tenggelam</i>	'sink'

In the two attested lexical roots of four syllables, primary stress also falls on the penultimate syllable, as shown in Table 40.

Table 40: Stress patterns for quadrisyllabic lexical roots (2 items)

Stress	Item	Orthogr.	Gloss
P-ULT	/ɔ.la.'ra.ga/	<i>olaraga</i>	'do sports'
	/kɛ.tʃu.'a.li/	<i>kecuali</i>	'except'

The data presented in Table 38 to Table 40 demonstrates that Papuan Malay has a clear preference for penultimate stress. Of the 1,072 lexical roots with more than one syllable, 964 roots (90%) have penultimate stress, as shown in Table 41. There are, however, also many lexical roots that deviate from this basic pattern and have ultimate stress (108/1,072 – 10%). As already mentioned, in 105 of the 108 lexical roots with ultimate stress (97%), the penultimate syllable contains the front open-near vowel /ɛ/. Ultimate stress, however, is not conditioned by the front open-near vowel. These findings suggest that while stress in Papuan Malay is not phonemic, it has lexicalized for these items. Minimal pairs are not attested, however.

Table 41: Stress patterns for lexical roots – Frequencies

Syllable types	P-ULT stress	ULT stress	Total
Disyllabic	899	104	1,003
Trisyllabic	63	4	67
Quadrisyllabic	2	0	2
Total	964	108	1,072

#### 2.4.4.2. Stress patterns for historically derived lexical items

Lexical items that are historically derived by (unproductive) affixation show the same stress patterns as lexical roots.<sup>77</sup> These findings are based on a word list with 381 items, extracted from the above-mentioned 2,458-item word list. The basic stress patterns of these items are exemplified in Table 42 to Table 44; the 'Affix' column presents the historical affix.

<sup>77</sup> For a detailed discussion on derivation processes in Papuan Malay see §3.1. Note that the (historical) affixes have phonological allomorphs: /ta-/ and /ter-/ for example, are allomorphs of prefix *TER-*, /pl-/ is an allomorph of prefix *PE(N)-*, and /br-/ and /ba-/ are allomorphs of prefix *BER-* (the small caps designate abstract representation of the affixes as they have more than one form of realization).

Stress patterns for disyllabic items are presented in Table 42. Most disyllabic items have penultimate stress (17/22 items – 77%). The remaining five items (23%) have ultimate stress. In prefixed items in which the prefix is reduced to a consonant and forms a CC cluster with the onset consonant of the lexical root, stress is assigned to the penultimate syllable of the derived lexical item, as in *brangkat* /'braŋ.kat/ 'leave' or *spulu* /'spu.lu/ 'ten'. In items with an unreduced prefix, stress remains on the lexical root and thereby on the ultimate syllable, as in *bergrak* /ber.'grak/ 'move'.

Table 42: Stress patterns for disyllabic affixed lexical items

Stress	Item	Affix	Orthography	Gloss
P-ULT	/'braŋ.kat/	/br-_/	<i>brangkat</i>	'leave'
	/!pla.dʒar/	/pɛl-_/	<i>plajar</i>	'teacher'
	/'spu.lu/	/se-_/	<i>spulu</i>	'ten'
	/!gra.kaj/	/_-aŋ/	<i>grakang</i>	'movement'
ULT	/ber.'grak/	/ber-_/	<i>bergrak</i>	'move'
	/se.'blas/	/sɛ-_/	<i>seblas</i>	'eleven'
	/ta.'bla/	/ta-_/	<i>tabla</i>	'be cracked open'

Stress patterns for trisyllabic lexical items are presented in Table 43. Almost all them have penultimate stress (259/272 items – 95%). That is, when a disyllabic lexical root is suffixed, the stress moves from the penultimate syllable of the root to its ultimate syllable, as in *ikat* /i.kat/ 'tie up' versus *ikatang* /i.'ka.taŋ/ 'tie'. The remaining 13 items (5%) have ultimate stress, with the antepenultimate syllable carrying secondary stress. The respective roots of the 13 items also carry ultimate stress, as in *kebung* /ke.'buŋ/ 'garden' versus *berkebung* /ber.ke.'buŋ/ 'do farming'.

Table 43: Stress patterns for trisyllabic affixed lexical items

Stress	Item	Affix	Orthogr.	Gloss
P-ULT	/ba.'i.si/	/ba-_/	<i>baisi</i>	'be muscular'
	/pɛ.'mu.da/	/pɛ-_/	<i>pemuda</i>	'young person'
	/ke.'du.a/	/ke-_/	<i>kedua</i>	'second'
	/ta.'gɔ.jaŋ/	/ta-_/	<i>tagoyang</i>	'be shaken'
	/se.'ti.ap/	/sɛ-_/	<i>setiap</i>	'every'
	/i.'ka.taŋ/	/_-aŋ/	<i>ikatang</i>	'tie'
	/mi.'sal.pa/	/_-pa/	<i>misalnya</i>	'for example'
ULT	/ber.ke.'buŋ/	/ber-_/	<i>berkebung</i>	'do farming'
	/ke.em.'pat/	/ke-_/	<i>keempat</i>	'fourth'
	/mɛ.jɛ.'braŋ/	/mɛ-_/	<i>menyebrang</i>	'cross'
	/ter.le.'pas/	/ter-_/	<i>terlepas</i>	'be loose'

Examples of derived lexical items with four syllables are presented in Table 44. All 88 items have penultimate stress, while secondary stress falls on the alternating syllable preceding the one carrying the primary stress. Again, when suffixed the stress moves to the ultimate syllable of the root, as in *dalam* /'da.lam/ 'inside' versus *pedalamang* /,pɛ.da.'la.maŋ/ 'interior'.

Table 44: Stress patterns for quadrisyllabic affixed lexical items

Stress	Item	Affix	Orthogr.	Gloss
P-ULT	/,pɛ.da.'la.maŋ/	/pɛ--aŋ/	<i>pedalamang</i>	'interior'
	/,kɛ.gi.'a.taŋ/	/kɛ--aŋ/	<i>kegiatan</i>	'activity'
	/,kɛn.da.'ra.aŋ/	/--aŋ/	<i>kendaraang</i>	'vehicle'
	/,sɛ.be.'nar.ŋa/	/sɛ--ŋa/	<i>sebenarnya</i>	'actually'

The data presented in Table 42 to Table 44 show that the Papuan Malay preference for penultimate stress also applies to lexical items that are historically derived by (unproductive) affixation. The vast majority of the 381 items (363 – 95%) have penultimate stress, as shown in Table 45. For suffixed items, this stress pattern implies a stress-shift from the penultimate syllable of the root to its ultimate syllable. Only a small number of items deviates from this basic stress pattern and displays ultimate stress (18/381 – 5%). For 13 of the 18 items, their respective lexical roots also have ultimate stress, while another four have monosyllabic roots; the remaining item has non-compositional semantics (*tagait* 'be hooked').<sup>78</sup>

Table 45: Stress patterns for historically derived lexical items – Frequencies

Syllable types	P-ULT stress	ULT stress	Total
Disyllabic	17	5	22
Trisyllabic	259	13	272
Quadrisyllabic	87	---	88
Total	363	18	381

## 2.5. Non-native segments and loan words

This section describes non-native segments and loan words attested in the Papuan Malay corpus. So far, 718 items of the 2,458-item word list (29%) have been identified as loan words, originating from different donor languages, such as Arabic, Chinese, Dutch, English, Persian, Portuguese, or Sanskrit. Not included here are inherited Malay words which are typically used in Standard Indonesian but not in Papuan Malay, such as Indonesian *desa* 'village' or *mereka* '3PL' (the corresponding Papuan Malay words are *kampung* 'village' and *dorang/dong* '3PL', respectively). (See also §1.8.6.)

The non-native segments are presented in §2.5.1, followed in §2.5.2 by a description of the phonological and phonetic processes that native and non-native

<sup>78</sup> The historical root *gait* does not exist in Papuan Malay.

segments can undergo in loan words. The phonotactics found in loan words are investigated in §2.5.3.

### 2.5.1. Non-native segments

In the investigated loan words, two consonantal segments occur that are not part of the Papuan Malay consonant inventory: the voiceless labio-dental fricative /f/ and the voiceless postalveolar fricative /ʃ/.

The voiceless labio-dental fricative /f/ is attested in 49 loan words. It occurs as word-initial and word-internal onset and as word-final coda, as illustrated in Table 46.

Table 46: Labio-dental fricative /f/

Position	Item	Orthogr.	Gloss	Donor language
Word-initial onset	[ <sup>h</sup> fa.dʒɛr]	<i>fajar</i>	‘dawn’	Arabic
	[ <sup>h</sup> fɔ.tɔ]	<i>foto</i>	‘photo’	Dutch
Word-initial onset	[ <sup>h</sup> si.fet <sup>h</sup> ]	<i>sifat</i>	‘characteristic’	Arabic
	[ <sup>h</sup> trens.fɛr]	<i>transfer</i>	‘transfer’	English
Word-final coda	[ma. <sup>h</sup> ɛf]	<i>maaf</i>	‘pardon’	Arabic
	[m. <sup>h</sup> sɛn.tɪf]	<i>insentif</i>	‘incentive’	English

The second non-native segment occurs in loan words of Arabic origins containing the voiceless postalveolar fricative /ʃ/. Standard Malay and Standard Indonesian have adopted the fricative into their consonant inventory, realizing it as /ʃ/ <sy> as in *syurga* ‘heaven’ (Mintz 2002: 13).<sup>79</sup> Papuan Malay, by contrast, has not adopted the postalveolar fricative. Instead, Papuan Malay speakers employ three different substitution strategies to realize the fricative in loan words of Arabic origins, some of which may have been borrowed into Papuan Malay via Standard Indonesian. The most common strategy is to replace /ʃ/ with the alveolar fricative [s]. Alternative strategies are to substitute /ʃ/ with the palatalized alveolar fricative [s<sup>j</sup>], or with the consonant sequence [s.j]. In the same utterance or conversation, speakers may employ more than one strategy.

The three substitution strategies are illustrated in Table 47. The item *masarakat* ‘community’, for example, is most commonly realized with the alveolar fricative [s]. The items *syarat* ‘condition’ and *syukur* ‘thanks to God’ are, instead, realized with the palatalized alveolar fricative [s<sup>j</sup>]. Alternatively, speakers sometimes replace /ʃ/ with the consonant sequence [s.j], thereby changing the syllable pattern of the target item as in *dasyat* [<sup>h</sup>des.jet<sup>h</sup>] ‘terrifying’.

<sup>79</sup> Mintz (2002: 13) represents /ʃ/ as /š/ and defines it as “a palatal fricative”: *syurga* /šur.ga/ ‘heaven’.

Table 47: Strategies to realize the standard Indonesian postalveolar fricative<sup>80</sup>

Orthogr.	Gloss	Realization	Freq.	Item in SI
<i>masarakat</i>	‘community’	[,ma.sa.'ra.ket <sup>ʔ</sup> ]	27	<i>masyarakat</i>
		[,ma.s <sup>ʃ</sup> a.'ra.ket <sup>ʔ</sup> ]	11	
<i>asik</i>	‘be passionate’	[ <sup>ʔ</sup> a.sik <sup>ʔ</sup> ]	1	<i>asyik</i>
<i>dasyat</i>	‘terrifying’	[ <sup>ʔ</sup> da.s <sup>ʃ</sup> et <sup>ʔ</sup> ]	2	<i>dasyat</i>
		[ <sup>ʔ</sup> dɛs.jɛt <sup>ʔ</sup> ]	4	
<i>syarat</i>	‘condition’	[ <sup>ʔ</sup> s <sup>ʃ</sup> a.rɛt <sup>ʔ</sup> ]	2	<i>syarat</i>
<i>syukur</i>	‘thanks to God’	[s <sup>ʃ</sup> u.kur]	3	<i>syukur</i>

### 2.5.2. Phonological and phonetic processes in loan words

Overall, the same phonological and phonetic processes apply for loan words as for inherited Malay roots (see §2.2 and §2.3). Two processes, however, need to be discussed in more detail. The first is the lack of nasal place assimilation (§2.5.2.1) and the second is the palatalization of the alveolar fricative (§2.5.2.3).

#### 2.5.2.1. Lack of nasal place assimilation

In loan words, a nasal in the word-internal coda position typically obtains its place features from the following segment in the same way as it does in inherited Malay roots (§2.2.1). When preceding the alveolar fricative, the nasal is typically realized as /ŋ/. Examples are *jambu* ‘rose apple’, *cinta* ‘love’, or *bengkel* ‘repair shop’, and *bangsa* ‘people group’ or *fungsi* ‘function’.

In some loan words, however, the nasal does not undergo assimilation, as illustrated in Table 48. Instead, the bilabial or the alveolar nasal is followed by a consonant with different place features as in *jumla* ‘sum’ or *tanpa* ‘without’.

Table 48: Lack of nasal place assimilation in the word-internal coda in loan words

Realization	Item	Orthogr.	Gloss	Donor language
[m]	[a'lom.ni]	<i>alumni</i>	‘alumnus’	Latin
	[ <sup>ʔ</sup> dzom.la]	<i>jumla</i>	‘sum’	Arabic
	[kɔŋ'sum.si]	<i>konsumsi</i>	‘consumption’	Dutch
[n]	[ <sup>ʔ</sup> tan.pa]	<i>tanpa</i>	‘without’	(uncertain <sup>81</sup> )
	[men.'fa.ɛt <sup>ʔ</sup> ]	<i>manfaat</i>	‘benefit’	Arabic
	[ <sup>ʔ</sup> m.fɔr.'ma.si]	<i>informasi</i>	‘information’	Dutch

<sup>80</sup> Abbreviations: SI = Standard Indonesian.

<sup>81</sup> In Jones (2007), *tanpa* ‘without’ is not listed as a loan word. Tadmor (2009), however, classifies the item as “clearly borrowed”, listing Sudanese, Balinese, and Javanese as “uncertain” donor languages.

### 2.5.2.2. Lenition

Lenition is attested only for the bilabial voiceless stop in two lexical items, namely *kopi* ‘coffee’ and *pikir* ‘think’. Inter-vocally, the bilabial stop in *kopi* [ˈkɔ.pi] ‘coffee’ can be lenited by means of spirantization to fricative [f] giving [ˈkɔ.fi] ‘coffee’. When following a lexeme with word-final vowel, the word-initial stop in *pikir* [ˈpi.kɪr] ‘think’ can be lenited to [f], as in [ˈsa ˈfi.kɪr] *sa pikir* ‘I think’ or [ˈsu.da ˈfi.kɪr] *suda pikir* ‘already thought’.<sup>82</sup>

### 2.5.2.3. Palatalization of the alveolar fricative

Palatalization of the alveolar fricative /s/ occurs in loan words in an environment identical to that found in inherited Malay roots (§2.3.1.4). That is, palatalization of alveolar /s/ occurs in loan words with a /si.V/ sequence, if the lexical item consists of three or more syllables and if the syllable containing /s/ is unstressed. Attested are three loan words with /si.o/ or /si.a/ sequences, presented in Table 49. Again, the palatalization of /s/ co-occurs with the elision of close front /i/, which reduces the number of syllables by one. Hence, /si.a/ is realized as [sʲa] and /si.o/ as [sʲɔ]. In loan words with a /si.a/ sequence in which the syllable containing /s/ is stressed, /s/ is not palatalized, as in *manusia* ‘human being’.<sup>83</sup>

Table 49: Palatalization of the alveolar fricative in loan words

Stress	Orthogr.	Gloss	Realization	Freq.
/si/ unstressed	<i>misionaris</i>	‘missionary’	[ˌmi.si.ɔ.ˈna.ris]	1
			[ˌmi.sʲɔ.ˈna.rɪs]	10
	<i>nasional</i>	‘national’	[ˌna.si.ɔ.ˈnɛl]	1
			[ˌna.sʲɔ.ˈnɛl]	2
	<i>sosial</i>	‘social’	[sɔ.sɪ.ˈɛl]	2
			[sɔ.sʲɛl]	3
/ˈsi/ stressed	<i>manusia</i>	‘human being’	[ˌma.nu.ˈsi.a]	49
	<i>rahasia</i>	‘secret’	[ˌra.ha.ˈsi.a]	4
	<i>usia</i>	‘age’	[u.ˈsi.a]	5

<sup>82</sup> Notably, for both loan words, the source forms contain fricative /f/ rather than stop /p/: the source form for *kopi* ‘coffee’ is Dutch *koffie* and the source form for *pikir* ‘think’ is Arabic *fikr*.

<sup>83</sup> Loan words with a /si.ɔ/ sequence in which the syllable containing /s/ is stressed are unattested.

### 2.5.3. Phonotactics in loan words

This section describes the phonotactics found in loan words: the consonant distribution and sequences are described in §2.5.3.1, the vowel distribution and sequences in §2.5.3.2, and the syllable structures and stress patterns in §2.5.3.3.

#### 2.5.3.1. Consonant distribution and sequences

The distribution of consonants in loan words corresponds to their distribution in inherited Malay roots (see §2.4.1). This also applies to the loan fricative /f/, which has the same distribution as the alveolar fricative /s/ and occurs in all positions.

In loan words a restricted sample of consonants can occur in consonant clusters, as illustrated in Table 50. The range of consonants occurring in word-initial consonant clusters is considerably larger than the range of consonants occurring in word-internal clusters, similar to their distribution in inherited Malay roots.

Table 50: CC and CCC clusters – Examples

Onset CC clusters: Stops in C <sub>1</sub> position					
Word-initial position			Word-internal position		
/pC <sub>2</sub> /	/' <b>prak</b> .tek/	'practicum'	/pC <sub>2</sub> /	/ɔ.' <b>pra</b> .si/	'operation'
	/' <b>plas</b> .tik/	'plastic'		/' <b>am</b> .plop/	'envelop'
/bC <sub>2</sub> /	/' <b>bri</b> .ta/	'news'	/bC <sub>2</sub> /	/'dɔ.' <b>brak</b> /	'smash'
				/'i.' <b>blis</b> /	'devil'
/tC <sub>2</sub> /	/' <b>tra</b> .di.si/	'tradition'	/tC <sub>2</sub> /	/' <b>ba</b> .trɛj/	'battery'
/dC <sub>2</sub> /	/' <b>dram</b> .ben/	'marching band'			
/kC <sub>2</sub> /	/' <b>kna</b> l.pət/	'muffler'	/kC <sub>2</sub> /	/' <b>rɛ</b> .kre.'a.si/	'recreation'
	/' <b>krɛ</b> .ma.si/	'cremation'		/' <b>bis</b> .kwit/	'cracker'
	/' <b>klas</b> /	'class'			
	/' <b>kwa</b> /	'broth'			
/gC <sub>2</sub> /	/' <b>grɔ</b> .bak/	'wheelbarrow'	/gC <sub>2</sub> /	/' <b>nɛ</b> .gri/	'state'
	/' <b>glɔ</b> .dʒɔ/	'be greedy'			

Onset CC and CCC clusters: Fricatives in C <sub>1</sub> position					
Word-initial position			Word-internal position		
/fC <sub>2</sub> /	<u>/ʃrɛj/</u>	‘be blank’			
/sC <sub>2</sub> /	<u>/ʃpa.tu/</u>	‘shoe’	/sC <sub>2</sub> /	<u>/in.ʻstan.si/</u>	‘level’
	<u>/ʃta.tus/</u>	‘status’			
	<u>/ʃskɔ.la/</u>	‘school’			
	<u>/ʃsmɛn/</u>	‘cement’			
	<u>/ʃsnɛk/</u>	‘snack’			
	<u>/ʃsla.mat/</u>	‘be safe’			
	<u>/ʃswa.mi/</u>	‘husband’			
	<u>/ʃsprɛj/</u>	‘bedsheet’			
	<u>/ʃstrap/</u>	‘punish’			
	<u>/ʃskrip.si/</u>	‘minithesis’			
Coda CC clusters					
Word-final position					
/rt/	<u>/ʃer.pɔrt/</u>	‘airport’			
/ks/	<u>/ʃkɔm.plɛks/</u>	‘complex’			

The data presented in Table 50 shows considerable similarities between loan words and inherited Malay roots in terms of the distribution of consonants in CC clusters (see Table 26). There are, however, also some differences. A number of CC clusters that are found in inherited Malay roots are not attested in loan words: /tɫ/, /dɫ/, /tʃr/, /gn/, and /sr/. By contrast, the following onset CC attested in loan words are unattested in inherited Malay roots: /gr/, /fr/, /st/. In addition, two word-final CC clusters are found in loan words, /rt/ and /ks/.<sup>84</sup> Finally, three onset CCC clusters are attested: /spr/, /str/, and /skr/.

Table 51 presents an overview of the attested consonant clusters. For the most part, the consonant clusters attested in loan words agree with Kenstowicz’s (1994: 254) Sonority Sequencing Principle (see §2.4.1).

Almost all clusters listed in Table 51 occur in word-initial position. The exception is /bl/ which occurs only as word-internal onset. Those clusters that are attested as word-initial and word-internal onset are underlined; /bl/ is also underlined. The two CC clusters in word-final coda position are double-underlined.

<sup>84</sup> Four loan words are attested with word-final CC cluster: *erport* ‘airport’, *kompleks* ‘complex’, *petromaks* ‘kerosene lantern’ and *raport* ‘school report book’. Rather commonly, however, these items are realized without the word-final CC cluster, as in [ʃer.pɔr] ‘airport’, [kɔm.plɛk] ‘complex’, or [pɛ.trɔ.mɛs] ‘kerosene lantern’.



V <sub>1</sub> .V <sub>2</sub>	Stress	Item	Gloss	Freq.
/u.a/	/ʰCu.a/	/ʰ <u>smu.a</u> /	‘all’	1
	/Cu.ʰa/	/p <u>u.a</u> .sa/	‘fast’	4
/ε.ɔ/	/ʰCε.ɔ/	/fi.ʰ <u>dε.ɔ</u> /	‘video’	2
/ε.a/	/Cε.ʰa/	/r <u>ε.a</u> k.si/	‘reaction’	2
/ɔ.i/	/ʰCɔ.i/	/ε.ʰ <u>gɔ.is</u> /	‘be egoistic’	1
/ɔ.a/	/ʰCɔ.a/	/ʰ <u>sɔ.ak</u> /	‘be weak’	5
	/Cɔ.ʰa/	/ɔn. <u>dɔ.a</u> .fi/	‘traditional chief’	1
/a.i/	/ʰCa.i/	/a.ʰ <u>dʒa.ip</u> /	‘be miraculous’	2
/a.u/	/ʰCa.u/	/ʰ <u>ma.ut</u> /	‘death’	1
/a.ε/	/Ca.ʰε/	/da.ʰ <u>ε.ra</u> /	‘area’	1
/a.a/	/ʰCa.a/	/dʒε.ʰ <u>ma.at</u> /	‘congregation’	3
	/Ca.ʰa/	/ma.ʰ <u>af</u> /	‘pardon’	1

The attested V.V sequences and their frequencies are summarized in Table 53. V.V sequences that are attested only once are underlined. Similar to inherited Malay roots, the V<sub>1</sub> position is most often occupied by a close vowel (37/56 items – 66%). Open-mid and open vowels, however, are also quite common in this position (19/56 items – 34%). The V<sub>2</sub> position is again most often taken by the open central vowel (40/56 lexical roots – 71%), although close and open-mid vowels are also permitted in this position (16/56 lexical roots – 29%).

Table 53: V.V sequences and frequencies – Overview

V <sub>1</sub> .V <sub>2</sub>	i	u	ε	ɔ	a	Total
i	---	<u>i.u</u> 1	---	i.ɔ 8	i.a 23	32
u	---	---	---	---	u.a 5	5
ε	---	---	---	ε.ɔ 2	ε.a 2	4
ɔ	ɔ.i 1	---	---	---	ɔ.a 6	7
a	a.i 2	<u>a.u</u> 1	<u>a.ε</u> 1	---	a.a 4	8
Total	3	2	1	10	40	56

Most of the V.V sequences found in loan words (44/56 – 79%) are sequences of rising sonority (Parker 2008), similar to V.V sequences in inherited Malay roots (see §2.4.2). The remaining twelve vowel sequences include seven V.V sequences of equal sonority (/i.u/, /ε.ɔ/ and /a.a/), and five V.V sequences of falling sonority (/ɔ.i/, /a.i/, /a.u/, and /a.ε/).

### 2.5.3.3. Syllable structure and stress patterns

The syllable types and stress patterns for mono- and polysyllabic loan words are illustrated in Table 54 to Table 58. The basis for this investigation is the above-mentioned word list with 718 loan words.

Monosyllabic loan words with their different arrangements of C and V are presented in Table 54. The data indicates a clear preference for closed syllables with an onset consonant (85/86 – 99%); only one item contains an onset vowel. The data also shows that monosyllabic loan words with onset consonant clusters are very common: 32 items (37%) have a CC cluster and another four items (5%) have a CCC cluster.

Table 54: Monosyllabic loan words (86 items)

Syllable types	Count	Item	Gloss
VC	1	/ʷɔm/	‘uncle’
CV	4	/ʰtɛ/	‘tea’
CVC	45	/ʰdʒin/	‘genie’
CCV	2	/ʰkwa/	‘broth’
CCVC	30	/ʰtrɛk/	‘truck’
CCCVC	4	/ʰstrɔm/	‘electricity’

Disyllabic loan words with their attested syllable types and stress patterns are presented in Table 55. They are, with 421 items, the most common, a preference corresponding to that found for inherited Malay roots. While CV(C) syllables are preferred, the data also shows that consonant clusters are quite common: the corpus includes 59 items (14%) with an onset CC cluster, three items (0.7%) with an onset CCC cluster, and four items (1%) with a coda CC cluster. By contrast, only 41 of the attested 1,003 inherited disyllabic Malay roots (4%) have an onset CC cluster (§2.4.3).

Most of the disyllabic loanwords have penultimate stress (375/421 – 89%), while 46 items have ultimate stress (11%). This corresponds to the stress patterns observed for inherited disyllabic Malay roots: 104 of 1,003 roots (10%) have ultimate stress (§2.4.4.1).

Table 55: Disyllabic loan words (421 items)

Syllable types	Count	Item	Gloss
Ultimate stress			
V.CV	1	/a.ʰtɔ/	‘or’
V.CVC	1	/i.ʰman/	‘faith’

Syllable types	Count	Item	Gloss
CV.VC	1	/ma.'af/	'pardon'
CV.CV	2	/pɛ.'ta/	'map'
CV.CVC	18	/mi.'nit/	'minute'
CV.CCV	1	/nɛ.'gri/	'state'
CV.CCVC	2	/rɛ.'trit/	'retreat'
CVC.CV	4	/pɛr.'lu/	'need'
CVC.CVC	12	/kɔm.'bɔŋ/	'be inflated'
CVC.CCV	1	/mɛn.'tri/	'cabinet minister'
CVC.CCVC	1	/bis.'kwit/	'cracker'
CCV.CVC	2	/plɛ.'tɔn/	'platoon'
Penultimate stress			
V.CV	4	/'i.dɛ/	'idea'
V.CVC	18	/'i.dʒin/	'permission'
V.CCVC	1	/'i.blis/	'devil'
VC.CV	6	/'il.mu/	'knowledge'
VC.CVC	9	/'ɛm.bɛr/	'bucket'
VC.CVCC	1	/'ɛr.pɔrt/	'airport'
VC.CCV	2	/'in.trɔ/	'introduction'
VC.CCCV	1	/'ɛk.stra/	'extra'
VC.CCVC	1	/'am.plɔp/	'envelope'
CV.V	2	/'dɔ.a/	'prayer'
CV.VC	5	/'ta.at/	'be obedient'
CV.CV	72	/'ka.ja/	'be rich'
CV.CVC	103	/'hɔ.nɔr/	'honorarium'
CV.CVCC	1	/'ra.pɔrt/	'school report book'
CV.CCVC	2	/'dɔ.brak/	'smash'
CVC.CV	48	/'wak.tu/	'time'
CVC.CVC	51	/'kɔr.ban/	'sacrifice'
CVC.CCV	2	/'man.tri/	'male nurse'
CVC.CCVC	5	/'dis.trik/	'district'
CVC.CCVCC	1	/'kɔm.plɛks/	'complex'
CCV.V	1	/'smu.a/	'all'
CCV.CV	13	/'kwa.sa/	'power'
CCV.CVC	11	/'sla.mat/	'be safe'
CCV.CCVC	1	/'prɔ.gram/	'program'

Syllable types	Count	Item	Gloss
CCVC.CV	2	/ˈprik.sa/	‘check’
CCVC.CVC	9	/ˈknal.pət/	‘muffler’
CCVCC.CVC	1	/ˈtrans.fer/	‘transfer’
CCCV.CV	1	/ˈstri.ka/	‘iron’
CCVC.CV	1	/ˈskrip.si/	‘minithesis’

Trisyllabic loan words with their attested syllable types and stress patterns are presented in Table 56. With 160 items they are considerably less common than disyllabic loan words. Again the preferred syllable structure is CV(C). In addition, however, the corpus includes a considerable number of loan words with consonant clusters, that is, 17 items (11%) with an onset CC cluster, one item with an onset CCC cluster, and one item with a word-final CC cluster. By contrast, only one of the attested 66 inherited trisyllabic Malay roots has an onset CC cluster (§2.4.3).

Most of the trisyllabic loanwords have penultimate stress (136/160 – 85%), while 23 items have ultimate stress (14%) and one has antepenultimate stress. By comparison, only four of 66 inherited trisyllabic Malay roots (6%) have ultimate stress (§2.4.4.1).

Table 56: Trisyllabic loan words (160 items)

Syllable types	Count	Item	Gloss
Ultimate stress			
V.CV.CVC	1	/ɿ.tɔ.ˈnɔm/	‘autonomous’
VC.CV.CVC	1	/ɿ.in.si.ˈɲur/	‘engineer’
CV.CV.VC	2	/ɿ.sɛ.ri.ˈus/	‘be serious’
CV.CV.CV	1	/ɿ.rɛ.dʒɛ.ˈki/	‘livelihood’
CV.CV.CVC	6	/ɿ.dɔ.mi.ˈnan/	‘dominate’
CV.CV.CCVC	2	/ɿ.rɛ.pu.ˈblik/	‘republic’
CV.CCV.CVCC	1	/ɿ.pɛ.trɔ.ˈmaks/	‘kerosene lantern’
CV.CVC.CV	1	/ɿ.su.pɛr.ˈmi/	‘instant noodles’
CV.CVC.CVC	4	/ɿ.kɔ.man.ˈdan/	‘commandant’
CCV.CV.CVC	3	/ɿ.pre.si.ˈden/	‘president’
CVC.CV.CVC	1	/ɿ.kar.ta.ˈpɛl/	‘slingshot’

Syllable types	Count	Item	Gloss
Penultimate stress			
V.CV.V	2	/a.'rɔ.a/	'departed spirit'
V.CV.VC	2	/ɛ.'gɔ.is/	'be egoistic'
V.CV.CV	8	/a.'ca.ra/	'ceremony'
V.CV.CVC	3	/a.'la.mat/	'address'
V.CCV.CV	1	/ɔ.'pra.si/	'surgery'
V.CVC.CV	4	/a.'gen.da/	'agenda'
VC.CV.CV	4	/as.'ra.ma/	'dormitory'
VC.CV.CVC	2	/ɔk.'tɔ.ber/	'October'
VC.CVC.CVC	1	/in.'sen.tif/	'incentive'
VC.CCVC.CV	1	/in.'stan.si/	'level'
CV.V.CV	5	/pi.'a.ra/	'raise'
CV.V.CVC	1	/di.'a.lɛk/	'dialect'
CV.VC.CV	1	/rɛ.'ak.si/	'reaction'
CV.CV.V	9	/tʃɛ.'ri.a/	'be cheerful'
CV.CV.VC	2	/dʒɛ.'ma.at/	'congregation'
CV.CV.CV	35	/pɛ.'pa.ja/	'papaya'
CV.CV.CCV	1	/tʃɛ.'ri.tra/	'talk'
CV.CV.CVC	4	/na.'si.hat/	'advice'
CV.CVC.CV	4	/ta.'lɛn.ta/	'gift'
CV.CVC.CVC	8	/ke.'tʊm.bar/	'coriander'
CCV.V.CV	1	/pri.'ɔ.de/	'period'
CCV.VC.CV	1	/klu.'ar.ga/	'family'
CCV.CV.CV	3	/pri.'ba.di/	'be private'
CCV.CVC.CV	1	/prɔ.'pin.si/	'province'
CCCV.CV.CV	1	/stra.'tɛ.gi/	'strategy'
CVC.CV.VC	1	/man.'fa.at/	'benefit'
CVC.CV.CV	20	/pɛr.'tʃa.ja/	'trust'
CVC.CV.CVC	5	/kɔm.'pu.tɛr/	'computer'
CVC.CVC.CV	3	/sem.'pʊr.na/	'be perfect'
CVC.CCV.CVC	2	/kɔm.'plɔ.tan/	'(half)circle'
Antepenultimate stress			
CV.CV.CVC	1	/dʒɛ.ri.'kɛn/	'jerry can'

The corpus also contains 42 loan words of four syllables. Their syllable types and stress patterns are presented in Table 57. While they are quite rare among loan

words (42/718 – 6%), their portion is higher than that attested for inherited Malay roots (two out of 1,116 items). The preferred syllable structure is again CV(C). In addition, the corpus includes five loan words (12%) with an onset CC cluster. By contrast, neither of the two attested inherited quadrisyllabic Malay roots has a consonant cluster (§2.4.3). Most of the quadrisyllabic loanwords have penultimate stress (36/42 – 86%), while five items have ultimate stress (12%) and one has antepenultimate stress. By comparison, both inherited quadrisyllabic Malay roots have penultimate stress (§2.4.4.1).

Table 57: Quadrisyllabic loan words (42 items)

Syllable types	Count	Item	Gloss
Ultimate stress			
VC.CV.CV.CVC	1	/is.ti.ra.'hat/	'rest'
CV.CV.V.CVC	1	/na.si.ɔ.'nal/	'national'
CV.CV.CV.CVC	2	/ma.jɔ.ri.'tas/	'majority'
CCV.V.CV.CVC	1	/pri.ɔ.ri.'tas/	'priority'
Penultimate stress			
V.CV.CV.CV	1	/ɔ.tɔ.'nɔ.mi/	'autonomy'
V.CV.CV.CVC	1	/ɔ.tɔ.'ma.tis/	'be automatic'
VC.CV.V.CV	1	/ɔn.dɔ.'a.fi/	'traditional chief'
VC.CV.CV.CV	1	/is.ti.'mɛ.wa/	'be special'
VC.CV.CV.CVC	1	/an.ti.'fi.rus/	'antivirus'
VC.CCV.CV.CV	1	/as.trɔ.'nɔ.mi/	'astronomi'
VC.CVC.CV.CV	1	/in.fɔr.'ma.si/	'information'
CV.V.CV.CV	2	/bi.ɔ.'lɔ.gi/	'biology'
CV.CV.CV.V	5	/ma.nu.'si.a/	'human being'
CV.CV.V.CV	1	/dʒa.nu.'a.ri/	'January'
CV.CV.V.CVC	1	/ka.ri.'a.wan/	'employee'
CV.CV.CV.CV	6	/tɛ.lɛ.'fi.si/	'television'
CV.CV.CV.CVC	3	/ma.sa.'ra.kat/	'community'
CV.CV.CVC.CVC	2	/rɛ.fɛ.'rɛn.dum/	'referendum'
CV.CVC.CV.CV	4	/wa.wan.'tʃa.ra/	'interview'
CV.CVC.CV.CVC	1	/sɛ.kɛr.'ta.ris/	'secretary'
CV.CCV.V.CV	2	/fɛ.bru.'a.ri/	'February'
CVC.CV.CV.CV	1	/kɔr.di.'na.si/	'coordinate'
CVC.CV.CV.CVC	1	/kɔr.di.'na.tɔr/	'coordinator'
Antepenultimate stress			
V.CCV.CV.V	1	/a.'gra.ri.a/	'agrarian affairs'

In addition, the corpus also contains ten pentasyllabic roots which are presented in Table 58. Most of them have penultimate stress (6/9 – 67%), while two have ultimate stress and one has antepenultimate stress.

Table 58: Pentasyllabic roots (9 items)

Syllable types	Count	Item	Gloss
Ultimate stress			
V.CV.CVC.CV.CVC	1	/ <sub>1</sub> u.ni.fer.si.'tas/	'university'
CV.CV.CV.CV.CV	1	/ <sub>1</sub> pi.si.kɔ.lɔ.'gi/	'psychology'
Penultimate stress			
V.CVC.CV.V.CV	1	/ɔ.lɪm.pi.'a.de/	'Olympiad'
V.CVC.CV.CV.CV	1	/ɛ.man.si.'pa.si/	'emancipation'
CV.CV.V.CV.CVC	1	/mi.si.ɔ.'na.ris/	'missionary'
CV.CV.CV.CV.CV	2	/ma.te.ma.'ti.ka/	'mathematics'
CV.CVC.CV.CV.V	1	/sɛ.ker.ta.'ri.a/	'secretariat'
Antepenultimate stress			
CV.V.CV.CV.V	1	/ <sub>1</sub> tɛ.ɔ.'lɔ.gi.a/	'theology'

The data presented in Table 54 to Table 58 show that for loan words in Papuan Malay the preferred syllable types and stress patterns correspond to those attested in inherited Malay roots: most of the 718 loan words are disyllabic (421/718 – 59%) and most of the items with two or more syllables have penultimate stress (553/632 – 88%). Table 59 presents a frequency count for the attested syllable types and stress patterns. Also corresponding to inherited Malay roots, the preferred syllable structure is CV(C). Unlike native roots, however, a considerable number of loan words have consonant clusters, most of which are onset CC clusters.

Table 59: Syllable types and stress patterns for loan words – Frequencies

Syllable types	Stress patterns			Total
Monosyllabic	(n/a)			
Polysyllabic	ULT:	P-ULT:	A-P-ULT:	
Disyllabic	46	375	---	421
Trisyllabic	23	136	1	160
Quadrasyllabic	5	36	1	42
Pentasyllabic	2	6	1	9
	76	553	3	632

Quite often, but not always, the adaption of loan words into Papuan Malay involves stress shift from a syllable other than the penultimate one in the original item to the preferred penultimate syllable in the Papuan Malay word. This is illustrated in Table 60 with three loan words: *astronomi* 'astronomy' and *strategi* 'strategy' are loan words from Dutch which have ultimate stress, while *transfer* 'transfer' is an English

loan word which has ultimate stress. In Papuan Malay, by contrast, the three items are realized with stress on the penultimate syllable.

Table 60: Stress shift in loan words<sup>86</sup>

	Papuan Malay		Dutch	English
<i>astronomi</i>	əs.trɔ.'nɔ.mi	‘astronomy’	as.tro.no.'mi	ə.'stra.nə.mi
<i>strategi</i>	stra.'tɛ.gi	‘strategy’	stra.tə.'xi	'stræ.tɪ.dʒɪ
<i>transfer</i>	'trɛns.fɛr	‘transfer’	trans.'fʏ:r	tra:ns.'fɜ:(r)

## 2.6. Orthographic conventions

The orthographic (ORTH) conventions for the Papuan Malay consonant and vowel phonemes (PHON) used in this grammar are presented in Table 61.

Table 61: Orthographic conventions

Consonants																		
PHON	p	b	t	d	tʃ	dʒ	k	g	s	h	m	n	ɲ	r	l	j	w	
ORTH	p	b	t	d	c	j	k	g	s	h	m	n	ny	ng	r	l	y	w
Vowels																		
PHON	i	ɛ	u	ɔ	a													
ORTH	i	e	u	o	a													

The orthographic representation of the affricates, the palatal and velar nasals, and the palatal approximant follows the conventions for Standard Indonesian, as these are also used by Papuan Malay speakers when writing Papuan Malay. Stress is not marked in the examples and texts in this book; in the word lists in Appendix A, however, those lexemes which do not carry penultimate stress but ultimate or antepenultimate stress are marked with “x” for the interested reader.

For the representation of the velar nasal in the word-internal coda position, the surface realization is used rather than the underlying phonemic form, as in *bantu* ‘help’ and *janji* ‘promise’. In representing the palatalized alveolar fricative, the surface realization is used instead of the underlying phonemic form. That is, [sʲ] is represented as <sy> as in *syukur* ‘thanks to God’. For vocalic allophones, their surface realization instead of their underlying phonemic form is used if that allophone is also an independent phoneme. Examples are the alternative realizations of the vowel combinations /ai/ and /au/ (see §2.3.3), such as *capay* or *cape* ‘be tired’, or *pulaw* or *pulow* ‘island’. These conventions also apply to the orthographic representation of the (historical) affixes, if one element of the affix is also an independent segment; hence, *bakalay* /ba-'kalaj/ ‘to fight’ versus *bertriak* /ber-'triak/ ‘to scream’ or *talipat* /ta-lipat/ ‘be folded’ versus *terpaksa* /ter-'paksa/ ‘be

<sup>86</sup> The Dutch examples are taken from Worden.org MMXI (2010-) and the English examples from Oxford University Press (2000-).

forced' (see §3.1 for a detailed discussion on derivation processes in Papuan Malay and the realizations of the (historical) affixes).

In fast speech, Papuan Malay speakers very often shorten disyllabic lexical items to monosyllabic ones. This affects most often the personal pronouns (see §5.5 and Chapter 6), the possessive marker (see §9.1), and the following lexical items: *dengang* 'with' is shortened to *deng*, *bilang* 'say' to *blang*, *ini* 'D.PROX' to *ni*, *itu* 'D.DIST' to *tu*, *kasi* 'give' to *kas*, *pergi/pigi* 'go' to *pi*, and *suda* 'already' to *su*. Whenever speakers use these short forms, they are also given in the examples and texts in this grammar.

Vowel length is not phonemic in Papuan Malay. It does, however, have the pragmatic function of adding emphasis to a speaker's utterance, as discussed in §2.3.2.3. To indicate this emphasis in the context of this grammar, vowel lengthening is represented orthographically and realized with triple vowels.

## 2.7. Summary

The Papuan Malay phoneme inventory consists of 18 consonants (six stops, two affricates, two fricatives, four nasals, two liquids, and two approximants) and five vowels. In terms of Lass' (1984: 134–159) system typology of consonants and vowels, the Papuan Malay consonant and vowel systems show, overall, no typologically unexpected constellations, with the exception of the fricatives.

Consonant system: The obstruent system with its "cardinal" set /p t k/ and its palato-alveolar affricate set as "one 'intermediate' place" of articulation (Lass 1984: 147) shows no typologically unexpected constellations. The fricative system with alveolar /s/ and glottal /h/ is cross-linguistically less typical. Following Lass's (1984: 155) obstruent frequency hierarchy, systems with only two fricatives typically consist of alveolar /s/, to which labial /f/ rather than glottal /h/ is added. While the stop system is symmetric in terms of voice, the fricative system lacks a voiced series, while the nasal system lacks a voiceless series. The lack of both series, however, is cross-linguistically quite common. They correspond to Maddieson's (2011a: 4) findings that "fricatives are more commonly voiceless". They also agree with Lass's (1984: 155–157) findings that nasals show a clear "preference for voice". All consonants occur as onsets, while the range of consonants occurring in the coda position is considerably smaller.

Vowel system: The cross-linguistically very common "5-vowel" system with its "two heights in front and back with a low central vowel" (Lass 1984: 143) shows no typologically unexpected constellations. As is typical of such systems, the front vowels are unrounded while the back vowels are rounded (1984: 143). All five vowels occur in stressed and unstressed, open and closed syllables.

A restricted sample of like segments can occur in sequences. The constraints on their linear sequencing correspond to the Sonority Sequencing Principle if this is taken as a functional principle by which to explain the linear ordering of like segments. In CC clusters, the less sonorous segment precedes the more sonorous segment. The first consonant is typically a stop while the second consonant is a liquid. For V.V sequences the rise in sonority is less marked. The first vowel is most often a close vowel, while the second one is usually the open central vowel.

Papuan Malay shows clear preference for disyllabic roots and for CV(C), thereby displaying a “moderately complex syllable structure” (Maddieson 2011b: 4), which is typologically the most common structure. Cross-linguistically, however, Papuan Malay would be more likely to have a simple rather than a moderately complex canonical structure, as it consists of only 18 consonants. Primary stress typically falls on the penultimate syllable, although this stress pattern is not rigid. Secondary stress usually falls on the alternating syllable preceding the one carrying the primary stress. This stress pattern applies to lexical roots as well as to lexical items that are historically derived by (unproductive) affixation.

Adding to its 18 native consonant system, Papuan Malay has adopted one loan segment, the voiceless labio-dental fricative /f/. Also, Papuan Malay has developed three substitution strategies to realize the voiceless postalveolar fricative /ʃ/ found in loan words of Arabic origins. For the most part, the phonological and phonetic processes found in loan words correspond to those found in inherited Malay roots. The exception is the process of nasal assimilation, which is applied less rigorously. Consonants and vowels in loan words show the same distribution as in inherited Malay roots. In sequences of like segments, the range of attested consonants and vowels is wider in comparison to that found in inherited Malay roots. Further, for V.V sequences the rise in sonority is less marked. The preferred syllable types and stress patterns attested in loan words correspond to those found in inherited Malay roots. Compared to Malay roots, however, a larger number of loan words employ consonant clusters.

