BALANTAK PHONOLOGY AND MORPHOPHONEMICS

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Balantak is a member of the small Saluan language group (Saluan, Balantak, Andio) spoken in the extreme east of the eastern arm of Central Sulawesi. The languages are distinguished from surrounding languages, among other things, in that they have not undergone a process of word-final consonant erosion. Balantak phonology has a number of interesting features, including the occurrence of word-initial nasal-obstruent clusters, the various possible phonemic interpretations of which are considered here. Among morphophonemic processes described is a complex pattern of vowel harmony and consonant epenthesis which occur in the presence of the second person possessive suffix.

0 INTRODUCTION

This paper describes the basic features of Balantak phonology and morphophonemics as the language is spoken in the village of Dolom, eight kilometers from the subdistrict (kecamatan) capital of Balantak.[1] Balantak is a member of the Saluan subgroup (Eastern Group) of Central Sulawesi languages (Barr, Barr and Salombe, 1979:4,23-27), and is spoken by approximately 25,000 people.

Dialect variation in the Balantak language area of the Balantak and Lamala subdistricts is primarily lexical. Lexical similarity is approximately 90% or above between any two locations.[2] The phonologies of all dialects, with the exception of some morphophonemic variation, are nearly identical.

1 THE PHONOLOGICAL WORD

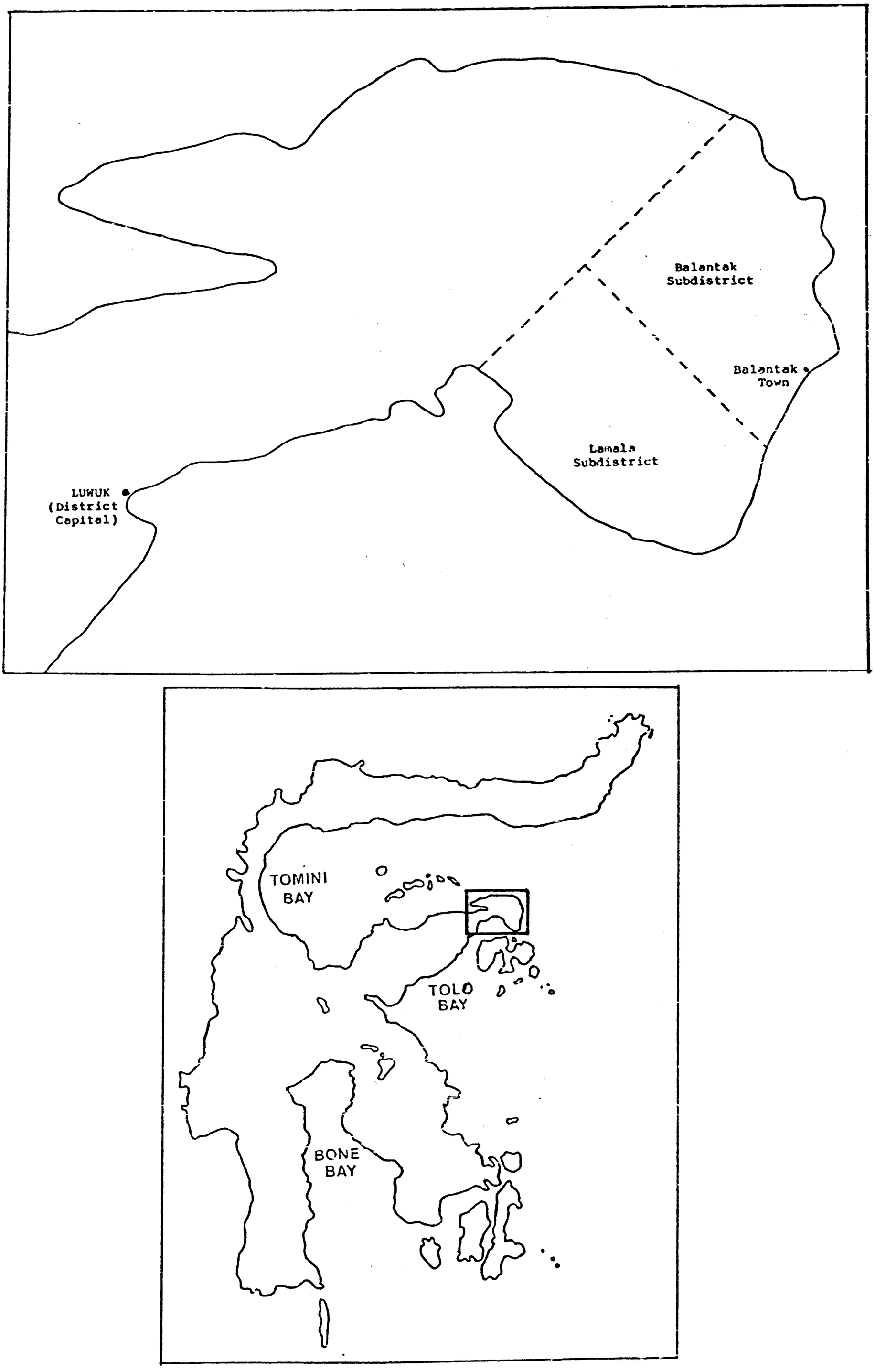
The phonological word is defined here as the domain of word stress. The phonological word (PW) may be one or more syllables (S), and can be summarized as follows for polysyllabic forms:

$$PW = ((\grave{S})\ S)\ \acute{S}\ S$$

The phonological word is normally disyllabic[3] and, as such, receives penultimate primary stress (´). The stressed syllable may typically be preceded by one or two syllables; if two, the initial syllable receives a secondary stress (`). The following forms illustrate these stress patterns:

Ś S	/liŋkoŋ/ [líŋkoŋ]	'fern'
	/kodoʔ/ [kódoʔ]	'monkey'
S Ś S	/bakokoʔ/ [bakokoʔ]	'machete'
	/kaʔapu/ [kaʔápu]	'cook'
S̀ S Ś S	/bolusukon/ [bòlusúkon]	'durian'
	/moroʔone/ [mòroʔóne]	'male'

On verbal forms, a single prefix, or a combination of prefixes



Map of Balantak Subdistrict

together, function, for stress purposes, as independent--but more weakly stressed--PW's.[4] Therefore, a three-syllable word containing a prefix would have secondary stress while a single-morpheme three-syllable word would not. Suffixes, however, unlike prefixes, are pulled into the stress pattern of the verb base and count as the ultimate syllable.[5] Note the following examples (plus symbol indicates morpheme boundary):

S̀ + Ś S	/nimbela/ [nìmbéla]	'wounded'
S̀ + S + Ś S	/mimi?ala/ [mìmi?ála]	'to try to get'
S̀ + S Ś + S	/membelai/ [mèmbelái]	'to wound'
S̀ + S + S Ś + S	/mampapatei/ [màmpapatéi]	'to kill'
S̀ + S + S Ś S	/notontokui/ [nòtontokúi]	'castrated'

2 THE SYLLABLE

The syllable comprises a nucleus consisting of a vowel (V), and optional margins consisting of consonants (C). A general formula may be written as follows:

S = ((C) C) V (C)

Syllable onset may consist of one or two consonants, while closure may consist of only one consonant.

2.1 Segment distribution in syllables

The consonants which occur word initially and word finally are noted in Table 1 below. Note that only /?/ is disallowed word initially, while voiced stops and semivowels are disallowed word finally.

	p	b	t	d	k	g	?	m	n	ŋ	s	l	r	w	y
Word-initial	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Word-final	X		X		X		X	X	X	X	X	X	X		

Table 1: Word-initial and Word-final Consonants in Balantak

The segments which may occur when two consonants precede a vowel in a syllable are restricted to a combination of a nasal phoneme and an obstruent phoneme; furthermore, the nasal has the same point of articulation as the following obstruent. This analysis is discussed further in section 3.2.5.

When a single consonant occurs intervocalically, native speaker intuition views this consonant as an onset for the following vowel. (This at times causes skewing of morpheme and syllable boundaries.) The only exception is the glottal consonant. It alone seems to function as closure for the preceding vowel. This, however, agrees with what we note in the table above, that glottal does not occur word initially. (Cf. section 2.2 for examples of this and other consonants.)

Where consonant clusters occur intervocalically, the first consonant is closure for the preceding vowel, and the second is onset for the following vowel, so that the syllable break falls between the two consonants. (Cf. section 3.2.5. for further discussion of consonant clusters, and formalization of phonotactic rules.)

Sequences of different vowels represent separate syllable nuclei and are not merely diphthongs. As noted above, when suffixes are added to root words with vowel sequences, stress will shift on individual vowels of sequences to follow the phonological word stress pattern of penultimate

primary stress. This basic feature is important for our understanding of sequences of identical vowels.

Sequences of identical vowels are phonetically long vowels. They are interpreted to be sequences of the same vowel for several reasons: 1) Sequences of different vowels, as noted above, are also found; therefore we might expect the same pattern for identical vowels. 2) The stress pattern of penultimate primary stress as described above demonstrates the appropriateness of such an interpretation.

Words which end in a long vowel or have a long vowel preceding a final consonant always receive the stress on the long vowel. Thus /palaa/, 'palm', is [palá:], not *[pála:], and /maŋ+kaan/, 'to eat', is [maŋká:n], not *[máŋka:n].

When stress shifts in sequences of identical vowels (phonetically one long vowel), there is no phonetically discernible shift of stress, as with sequences of different vowels, until the penultimate syllable falls outside of the identical vowel sequence.

For example:

[ká:n]	-->	/kaan/	'to eat'
[ká:non]	-->	/kaan+on/	'eaten'
[kà:nónku]	-->	/kaan+on+ku/	'eaten by me'

In the first two examples above, the stress does not shift phonetically from the long [a:] vowel. Only in the third example does primary stress shift from the long vowel and outside the root word.

Further examples of vowel sequences will be noted below in the description of vowels.

2.2 Syllable types and distribution

Six syllable types occur in Balantak:

Open syllables	Closed syllables
V	VC
CV	CVC
CCV	CCVC

Each of the above types may occur in stressed or unstressed position in the PW, and all may occur initially, medially, or finally except for the CCV(C) type; this type is restricted only to word-initial position. The closed syllable, CCVC, is very limited; only one example is noted below. (cf. section 3.2.5 for further discussion of this syllable type.)

The various syllable types and their combinations are illustrated in the following forms (period indicates syllable boundary):

Open syllables

V	/i/	'(person marker)'
	/o.e/	'rattan'
	/a.la/	'to get'
	/ku.u.ri/	'to shave'
CV	/na/	'to'
	/bi.no/	'for'
	/ko.li.ki/	'eyebrow'
	/bo.ku.la.li/	'ankle'
CCV	/mba.liʔ/	'because'
	/mba.ri.pi/	'formerly'
	/ŋge.a.ak/	'salive'
	/mba.a.na/	'where'

Closed syllables

VC	/us/	'(term to command dog)'
	/um.baʔ.a/	'a while ago'

	/la.am.poʔ/	'previously said'
	/ku.aŋ/	'skin'
CVC	/men/	'(relative pronoun)'
	/sam.baʔ/	'amazed'
	/si.nam.paŋ/	'always'
	/ta.loŋ/	'trap'
CCVC	/ntuʔ.u/	'over there'

3 SEGMENTS

3.1 Phoneme Chart

There are fifteen consonant phonemes and five vowel phonemes, as summarized in Tables 2 and 3 below:

		Labial	Alveolar	Velar	Glottal
stop	vl.	p	t	k	ʔ
	vd.	b	d	g	
nasal		m	n	ŋ	
fricative			s		
lateral			l		
flap/trill			r		
semivowel		w	y		

Table 2: Balantak consonant phonemes

	Front	Central	Back
high	i		u
mid	e		o
low		a	

Table 3: Balantak vowel phonemes

3.2 Description of Consonants

Consonants will be described in the following order: stops, fricatives, continuants, and nasals. (The stops and fricative are obstruents, the rest are sonorants.)[6]

3.2.1 Stops

/p/ Voiceless bilabial stop occurs in initial, medial, and final position within the phonological word. (In final position it is unreleased.)

[p]-	/pito/	'dregs'
	/poos/	'mosquito'
	/paparuk/	'shoulder'
-[p]-	/sopun/	'to blow nose'
	/sapaʔ/	'to discount'
	/opuu/	'egg'
-[pˀ]	/suap/	'to burn'
	/sosop/	'to suck'
	/irip/	'edge'

/b/ Voiced bilabial stop. In initial position it has a weakly imploded quality, which is somewhat diminished in medial position. The phoneme does not occur word finally.

[ɓ]-	/bentenŋ/	'satisfied'
	/bosi?/	'rotten'
	/bau?/	'pig'
-[ɓ]-	/sabakon/	'eclipse'
	/tobiliŋ/	'early afternoon'
	/tobok/	'to stab'

/t/ Voiceless dental stop occurs in initial, medial, and final positions. (In final position it is unreleased.)

[t]-	/tumbe/	'beginning'
	/toop/	'cigarette'
	/tambu?/	'to draw water'
-[t]-	/peeta/	'nest'
	/sintutu?/	'appropriate'
	/ritulun/	'three days ago'
-[t›]	/sapit/	'secretly'
	/wakat/	'root'
	/bunut/	'coconut husk'

/d/ Voiced alveolar stop. In initial position it has a slightly imploded quality (weaker than that of the voiced bilabial implosive). This imploded quality is almost completely lost in medial position. The phoneme does not occur word finally.

[ɗ]-	/doŋan/	'quickly'
	/deŋkul/	'crooked'
	/dapa?/	'stinging hairs on leaves'
-[d]-	/padak/	'to harvest'
	/lodoŋ/	'young furled banana leaves'
	/sida/	'can'

/k/ Voiceless velar stop occurs in initial, medial, and final positions. (In final position it is unreleased.)

[k]-	/kokuruŋ/	'thunder'
	/kauri?/	'left'
	/kuu/	'you (plural)'
-[k]-	/pika?/	'dark'
	/lako?/	'to hunt'
	/loka?/	'banana'
-[k›]	/siok/	'chicken' (cf. /sio / 'nine')
	/boloak/	'lamp'
	/wuuk/	'hair'

/g/ Voiced velar stop occurs in initial and medial positions only.

[g]-	/gimpaŋ/	'branch'
	/gagawaŋ/	'hesitant'
	/guas/	'to play'
-[g]-	/agor/	'speed'
	/igo?/	'(term of address for young girl)'
	/dogi?/	'like'

/?/ Glottal stop occurs in medial and final positions only. (Initial vowels may optionally be preceded by a glottal stop--in these instances the glottal stop is not phonemic.)

-[?]-	/lu?at/	'to pursue'
	/ro?up/	'face'
	/tu?os/	'mark'
-[?]	/liu?/	'ravine' (cf. /liu/ 'to pass')
	/lua?/	'to vomit'
	/kodi?/	'shortly'

3.2.2 Fricative

/s/ Voiceless alveolar fricative occurs in initial, medial and final position.

[s]-	/salan/	'path'
	/sio/	'high tide'
	/sempa/	'tamarind tree'
-[s]-	/kosian/	'doesn't exist'
	/pusa/	'to suffocate'
	/kasumpiʔ/	'cheek'
-[s]	/kabus/	'finished'
	/bolos/	'to borrow'
	/legas/	'bald'

3.2.3 Continuants

/l/ Voiced alveolar lateral occurs in initial, medial and final positions within the phonological word.

[l]-	/liila/	'tomorrow'
	/legoʔi/	'to visit'
	/laŋu/	'to swim'
-[l]-	/gala/	'vegetable'
	/kolon/	'shoulder strap'
	/bilak/	'impolite'
-[l]	/memel/	'cold'
	/tabiŋal/	'stubborn'
	/bokol/	'wave'

/r/ Voiced alveolar vibrant occurs in initial, medial and final positions. In initial and final positions it occurs as a trill. In medial position it occurs as a flap.

[r̃]-	/rimputuʔ/	'last night'
	/raraʔ/	'blood'
	/raeʔ/	'to go'
-[r̆]-	/orom/	'to immerse'
	/kiraʔ/	'to like'
	/pirit/	'dark'
-[r̃]	/baŋar/	'approximately'
	/uer/	'to carry together'
	/toposuur/	'full moon'

/w/ Voiced labio-velar semivowel (approximant) occurs in initial and medial positions within the phonological word.

[w]-	/wewer/	'lip'
	/wuras/	'seed'
	/waaʔ/	'to flood'
-[w]-	/kewaʔ/	'to acknowledge' (cf. /keaʔ/ 'cockatoo bird')
	/saweʔ/	'visitor'
	/rawut/	'to weed'

/y/ Voiced palatal semivowel (approximant) occurs in initial and medial positions within the phonological word.

[y]-	/yakuʔ/	'I (first person singular pronoun)'
	/yooŋ/	'to shake tree'
	/yuyuk/	'to decrease'
-[y]-	/koyuʔ/	'skin dirt' (cf. /kou / 'jungle cow')
	/alayoʔ/	'tall'
	/layaŋ/	'to fly'

3.2.4 Nasals[7]

/m/ Voiced bilabial nasal occurs in initial, medial and final positions.

[m]-	/malom/	'night'
	/mombuul/	'wind'
	/mian/	'person'
-[m]-	/lamas/	'dry bone' (cf. /lanas/ 'to boil food')
	/umuʔ/	'dumb'
	/limboʔ/	'to forget'
-[m]	/kintom/	'ironwood'
	/kaŋkan/	'small remainder'
	/susum/	'fish'

/n/ Voiced alveolar nasal occurs in initial, medial and final positions.

[n]-	/nauʔ/	'long time'
	/nuur/	'coconut'
	/niʔi/	'this'
-[n]-	/wiwine/	'female'
	/inauʔ/	'to remember'
	/kanaʔ/	'to hit'
-[n]	/liin/	'to separate' (cf. /liiŋ/ 'no one present'
	/ipuan/	'day after tomorrow'
	/telen/	'to swallow'

/ŋ/ Voiced velar nasal occurs in initial, medial and final positions.

[ŋ]-	/ŋaan/	'name'
	/ŋoor/	'nose'
	/ŋere /	'forehead'
-[ŋ]-	/laŋaʔ/	'not receive portion' (cf. /lamaʔ/ 'greasy')
	/dodoŋo/	'to reside'
	/puŋu/	'to tie'
-[ŋ]	/koboliuŋ/	'to encircle'
	/alaŋ/	'rice barn'
	/usoŋ/	'axe'

3.2.5 Nasal obstruent clusters

Nasal obstruent clusters present an interesting study in Balantak. They occur frequently in morpheme-medial position and much more rarely in morpheme-initial position. (They do not occur morpheme finally.)[8] The following clusters have been observed intramorphemically and they are the only consonant clusters which occur within a morpheme (across morpheme boundaries other consonant clusters do occur; cf. section 4.1.2.1.2):

mb	mp	
nd	nt	ns
ŋg	ŋk	

The logical options for analyzing these clusters are variously:

(a) an allophone of the corresponding nasal
(b) an allophone of the corresponding obstruent
(c) a prenasalized phoneme
(d) a sequence of two phonemes
(e) a prenasalized phoneme in some instances, a sequence of phonemes elsewhere

The following contrasts between the above clusters and their corresponding nasal or obstruent rule out the possibility that these clusters

are allophones of either the nasal or obstruent phoneme, options (a) and (b) above:

/mb/	/lambak/	'conceited'
/b/	/babar/	'group of gardens'
/m/	/tama/	'father'
/p/	/sapa/	'wedge'
/mp/	/gampal/	'underlayer'
/nd/	/pinduan/	'two times'
/d/	/sidutu/	'forever'
/n/	/inor/	'saliva'
/t/	/bitu?on/	'month'
/nt/	/pintuŋ/	'dark'
/ŋg/	/uŋgak/	'hornbill bird'
/g/	/baga?/	'lungs'
/ŋ/	/paŋa?/	'branch'
/k/	/bakar/	'breadfruit'
/ŋk/	/baŋkal/	'former garden'
/ns/	/lense/	'empty'
/s/	/wese?/	'tooth'
/n/	/wine?/	'seed'

Should these clusters be viewed as prenasalized phonemes, option (c)? Supporting this view is the fact that these clusters may occur initially in a single morpheme where they function as the onset of the syllable. No other consonant clusters which are unambiguously a sequence of two consonants within the same syllable occur in Balantak, giving further support to the view that these clusters are a single prenasalized phoneme. Note the following examples:

/mbaana/	'where' (free variation with /maana/)
/mbaripi/	'formerly' (free variation with /maripi/)
/mbali?/	'because' (free variation with /mali?/)
/ŋgaaŋgalaŋ/	'worm'
/ŋgeaak/	'saliva'

Root words or single morphemes which begin with a nasal plus obstruent are very limited in number. Furthermore, for the first three examples above with a labial nasal and stop, there is also a free variant with only the nasal; the stop is dropped.

More frequently, however, word-initial instances of nasal and obstruent occur on verbs or deictics (directionals) where only the syllable-final nasal of a prefix has been retained. For example:

/mVŋ/	+ /popor/	-->	/mompopor/ ~ /mpopor/		'to cut end evenly'
/mVŋ/	+ /balo?/	-->	/mambalo?/ ~ /mbalo?/		'to throw'
/kan/	+ /tu?u/	-->	/kantu?u/ ~ /ntu?u/		'over there'
/mVŋ/	+ /dawo?/	-->	/mandawo?/ ~ /ndawo?/		'to fall'
/mVŋ/	+ /sarak/	-->	/mansarak/ ~ /nsarak/		'to look for'
/mVŋ/	+ /karis/	-->	/maŋkaris/ ~ /ŋkaris/		'to grate'
/mVŋ/	+ /gora?/	-->	/moŋgora?/ ~ /ŋgora?/		'to make noise'

(/mVŋ/ indicates irrealis in contrast with /nVŋ/ which indicates realis; this distinction is lost in shortened forms.)

In these shortened forms, the nasal represents the prefix morpheme, so a morpheme boundary falls between the nasal and the obstruent. Even so, other Sulawesi languages like Uma (Martens:1988) and Ledo (Evans:n.d.) posit similar constructions as prenasalized phonemes.

We argue here for option (d), that these clusters are best interpreted in Balantak as a sequence of two phonemes, a nasal and an obstruent, for the following reasons:

1) When nasal obstruent clusters occur in morpheme- and word-medial

position, native speaker intuition always places the syllable break between the nasal and the obstruent. The nasal is closure (coda) for the preceding syllable and the obstruent is the onset for the following syllable. Since nasals may occur word finally, this should not surprise us. In these instances, nasal and obstruent always represent two phonemes. It does not seem inappropriate, therefore, to also view word-initial occurrences of nasal and obstruent as a sequence of two phonemes.

2) While there are no other instances of consonant sequences within a syllable, and to posit a consonant sequence in this case expands the number of syllable types (adding two, which have a very limited distribution--word initially only), to choose the alternative route of positing additional prenasalized obstruent phonemes seems less attractive to us. In this instance we opt for increasing the inventory of syllable types and thereby decreasing the inventory of phonemes.

If the nasal of the nasal obstruent cluster were viewed as syllabic, the syllable type inventory could be reduced. However, native speaker intuition does not view these nasals as syllabic.[10]

Option (e) is a more complex alternative. It would allow for two prenasalized phonemes, /mb/ and /ŋg/, where they occur initially in single morphemes as noted above. The word-initial clusters which are the result of shortened forms and clusters which occur intermorphemically would be treated as sequences of two phonemes. This option also seems less attractive to us. Both syllable type and phoneme inventories are increased. The interpretation of identical phonetic data involving the labial and velar phones above would be dependant on its morphological status.

If, therefore, we interpret all nasal obstruent clusters as a sequence of phonemes, a phonotactic feature of syllable structure in polysyllabic morphemes emerges. For closed syllables, ((C)C)VC, the following generalization holds:

> The syllable-final consonant (-C) in MORPHEME MEDIAL position must be either GLOTTAL, or a NASAL (N), and if the latter, it takes the same point of articulation (α) as its following Consonant (C-).

$$-C \rightarrow N\alpha / \_\_ C\alpha V$$

Furthermore, all intramorphemic sequences of consonants, CC, whether across syllable boundaries or within the syllable, will manifest the first C as a nasal and the following C as a homorganic obstruent.

(Note, as a result, that preceding another consonant intramorphemically, all nasal contrast of the nasal phonemes /m, n, ŋ/ is neutralized; the bilabial nasal occurs only before bilabial obstruents, the alveolar nasal occurs only before alveolar obstruents, and the velar nasal occurs only before velar obstruents.)

These phonotactic features are restricted--they are absolute only within morphemes. Across morpheme boundaries (involving suffixes, not prefixes) other consonant sequences can occur (cf. section 4.1.2.1.2 for examples). However, in many instances, as we will note below in the discussion of morphophonemics, it does hold true across morpheme boundaries as well, and seems, in these cases, to provide motivation for phoneme alternations in certain morphemes.

3.3 Description of vowels

Several vowel features were mentioned briefly in 2.1; vowels are described more fully here.

3.3.1 Vowel segments /i/ High close front unrounded vocoid.

[i]	/ili/	'to buy'
	/iili/	'irritated'
	/sian/	'no'
	/piile?/	'to see'

	/bantil/	'to inform'
	/asi/	'chin'

/e/ Mid open front unrounded vocoid.

-[e˘]	/ela?/	'birthmark'
	/pet/	'(sound of breaking)'
	/peet/	'to press'
	/rimberi?/	'yesterday'
	/pore/	'good'
	/pande/	'skilled'

/a/ Low open central unrounded vocoid.

[a]	/ale?/	'garden'
	/au?/	'dog'
	/paan/	'bait'
	/kar/	'plop'
	/kaar/	'trash'
	/tu?a/	'old'

/o/ High close back rounded vocoid.

[o]	/obos/	'to divide'
	/losi/	'dysentery'
	/loosi/	'to straighten'
	/noa/	'breath'
	/utok/	'brain'
	/suloo/	'heart'

/u/ High close back rounded vocoid.

[u]	/usan/	'rain'
	/uusan/	'pulp'
	/tunu/	'to burn'
	/sumpir/	'beard'
	/u?uru/	'new'
	/apu/	'fire'

3.3.2 Vowel sequences

3.3.2.1 Two-vowel sequences

All the possible two-segment sequences of the five vowels occur intramorphemically and are tabulated below in Table 4:

V1 \ V2	i	e	a	o	u
i	ii	ie	ia	io	iu
e	ei	ee	ea	eo	eu
a	ai	ae	aa	ao	au
o	oi	oe	oa	oo	ou
u	ui	ue	ua	uo	uu

Table 4: Balantak two-vowel sequences

The above constitute sequences of separate vowels and, for stress purposes, separate syllables (as discussed previously under 2.1.). Historically, it is clear that many of these VV derive from *VCV of which the intervocalic C has been lost. For example:

/kai/	'we (inclusive)'	cf. PAN *kami
/mai/	'come'	cf. PAN *maRi
/pae/	'rice'	cf. PAN *pajey

Examples of the other combinations in Table 4 are as follows:

/ii/	/kiidi/	'to remove edge'
/ie/	/kiek/	'peep'
/ia/	/malia?/	'often'
/io/	/lio?/	'drunk'
/iu/	/kiup/	'closed over'
/ei/	/gei?/	'slanted'
/ee/	/leelo?/	'to call'
/ea/	/memea?/	'red'
/eo/	/peok/	'to squeeze'
/eu/	/reureus/	'(sound of scraping coconut)'
/aa/	/daa/	'able'
/ao/	/pao?/	'to knead'
/au/	/wawau/	'to do'
/oi/	/koi/	'like'
/oe/	/koeŋ/	'head of grain'
/oa/	/oloa/	'far'
/oo/	/soosoodo/	'again'
/ou/	/toure?/	'neck'
/ui/	/lui?/	'rope'
/ue/	/lue/	'shaky'
/ua/	/rua?/	'two'
/uo/	/tuo?/	'to live'
/uu/	/uus/	'to chew'

3.3.2.2 Sequences of three of more vowels

A few examples of three-vowel sequences have been found to occur intramorphemically; the four-vowel sequences in the examples below only occur intermorphemically. (No vowel sequences of more than two identical vowels have been found.)

/eaa/	/ŋgeaak/	'saliva'
/eua/	/beua?/	'scorpion'
/iai/	/biai?/	'many'
/aioo/	/ala+i+o(+o)n/	'fetched by you (singular)'
/aaoo/	/daa+o(+o)n/	'can be done by you (singular)'
/oaoo/	/oloa+o(+o)n/	'you (singular) go away'

4 MORPHOPHONEMICS

Morphophonemics deals with the phoneme alternations in certain morphemes which occur in unique phonological environments. These alternations to the base form of the morpheme result in variants (or alternants, or allomorphs) which are in complementary distribution with each other.

Our focus here is on the phonological processes involved in phoneme alternations in Balantak.[11] Additionally, we probe the motivation, or the reasons why some of the alternations may exist. A primary factor in the instances noted here is that the phonotactics which prevail intramorphemically also seem in many instances to be preferred intermorphemically, i.e. at morpheme junctures within words. We select as the base form of the

morpheme that shape which is changed in other environments because of phonotactic (or other) considerations--the change is motivated. Even so, it is important to remember that not all morphemes are changed to accommodate to the "preferred structure".

We note both consonant alternations and vowel alternations, some special features of a morpheme in a third section, and conclude with a summary.

4.1 Consonant alternations

4.1.1 Nasal assimilation

We noted in section 3.2.5 the assimilation of syllable-final nasals preceding consonants; the nasal takes the same point of articulation as the following obstruent. This constraint, which always holds true within morphemes, also holds true with a variety of Balantak prefixes ending in a nasal juncture with following verb stems. These morphemes are the verbal prefixes mVŋ, nVŋ, pVŋ, miŋ, niŋ, piŋ, toŋ, and the counter saŋ.[12] These base forms occur before word stems which are vowel initial or velar obstruent initial (/k, g/). Before stems which are alveolar or labial obstruent initial, the final nasal of these prefixes assimilates to the point of articulation of the following obstruent. (See section 4.1.2.1.1 and 4.2.2 for alternations preceding sonorant-initial stems.)

(The set of miŋ, niŋ, and piŋ prefixes has variants which are homophonous to some variants of the mVŋ, nVŋ, and pVŋ set of prefixes; however, the vowel of the former never changes, which distinguishes it before most nonsonorant-initial stems.)

Note the following examples:

/mVŋ/	+ /bala/	-->	/mambala/	'to fence'
/nVŋ/	+ /kira?/	-->	/niŋkira?/	'liked'
/pVŋ/	+ /tunu/	-->	/puntunu/	'burn (imperative)'or 'instrument for burning'
/miŋ/	+ /sapit/	-->	/minsapit/	'hidden'
/niŋ/	+ /borek/	-->	/nimborek/	'lied'
/piŋ/	+ /oso?/	-->	/piŋoso?/	'wash hands (imperative)'
/toŋ/	+ /piile?/	-->	/tompiile?/	'unintentionally see'
/saŋ/	+ /bitu?on/	-->	/sambitu?on/	'one month'
/saŋ/	+ /taa?/	-->	/santaa?/	'one word'
/toŋ/	+ /giok/	-->	/toŋgiok/	'unintentionally move'
/saŋ/	+ /kau/	-->	/saŋkau/	'one tree'

4.1.2 Consonant loss

4.1.2.1 Nasal loss

4.1.2.1.1 In prefixes

No nasal-sonorant consonant sequences occur within morphemes. Similarly, for the verbal prefixes miŋ, niŋ, piŋ, toŋ, and the counter saŋ, the final nasal is deleted before verb stems and nouns beginning with sonorants (/m, n, ŋ, r, l, y, w/).

/miŋ/	+ /noa/	-->	/minoa/	'to breath'
/niŋ/	+ /ŋoap/	-->	/niŋoap/	'yawned'
/toŋ/	+ /yooŋ/	-->	/toyooŋ/	'unintentionally shake'
/saŋ/	+ /wuras/	-->	/sawuras/	'one seed'
/saŋ/	+ /loloon/	-->	/saloloon/	'one thousand'

4.1.2.1.2 In suffixes

No more than two consonants occur in sequence intramorphemically. The pronominal suffixes ŋku, '(first person singular possessive pronoun),' and nta, '(first person plural inclusive possessive pronoun),' both delete the nasal /ŋ/ and /n/ respectively following nouns ending with a consonant, ostensibly to conform to the pattern of a maximum of two consonants in sequence.

Note that with these suffixes, sequences other than nasal-obstruent consonants occur across morpheme boundaries. Where nasal and nonhomorganic sequences do occur, no assimilation has been noted in normal speech.

Note the examples below.

/tama/ + /ŋku/ -->	/tamaŋku/	'my father'
/nuur/ + /ŋku/ -->	/nuurku/	'my coconut'
/laigan/ + /ŋku/ -->	/laiganku/	'my house'
/apu/ + /nta/ -->	/apunta/	'our (inclusive) fire'
/siok/ + /nta/ -->	/siokta/	'our (inclusive) chicken'
/wuruŋ/ + /nta/ -->	/wuruŋta/	'our (inclusive) language'

4.1.2.2 Consonant coalescence[13]

No geminate consonant sequences occur intramorphemically. When the final consonant of a noun or verb base is identical to the initial consonant[14] of a following suffix or clitic, the two coalesce into a single segment. The consonants involved are /p, t, k, s, m, n/ in po, nta (where /p/ is also lost), kon, ŋku (where /ŋ/ is also lost), si, mo, muu, and na.[15] (Note here, in the instance of nta and ŋku, that clearly the process of deleting the nasal happens first, leaving two identical segments which then coalesce; in this case the order in which the phonological processes occur is significant.)

(When the initial consonants of kon and si coalesce with a preceding consonant, the resulting forms become homophonous with the verbal suffixes on and i. When the consonants of po and mo, nta and na, coalesce, there is little possibility of ambiguity because of the remaining consonant.)

/maʔulop/ + /po/ -->	/maʔulopo/	'before morning'
/bunut/ + /nta/ -->	/bunuta/	'our (inclusive) coconut husks'
/wuuk/ + /ŋku/ -->	/wuuku/	'my hair'
/sarak/ + /kon/ -->	/sarakon/	'look for (imperative)'
(cf. /sarak/ + /on/ -->	/sarakon/	'to be looked for')
/dampas/ + /si/ -->	/dampasi/	'(will be) free later'
(cf. /dampas/ + /i/ -->	/dampasi/	'(imperative) free (it)')
/susum/ + /muu/ -->	/susumuu/	'your (plural) fish'
/malom/ + /mo/ -->	/malomo/	'already night'
/ŋaan/ + /na/ -->	/ŋaana/	'his name'

4.1.2.3 Loss of glottal stop

No glottal consonant sequences can occur intramorphemically. There is in Balantak a set of prefixes which end in glottal stop before word stems beginning with a vowel, but which delete the glottal preceding verb stems beginning with a consonant. These include baʔ, kaʔ, kiʔ, niʔ, piʔ, pooʔ, tiʔ, toʔ, as well as maʔ, maraʔ, moʔ, mokoʔ, motoʔ and their corresponding sets of /n/-initial and /p/-initial prefixes. In all cases the glottal is deleted if the following word stem begins with a consonant. Only a few examples are noted below.

(The nonglottalized forms of the verbal prefixes niʔ, piʔ, and toʔ become homophonous with the reduced forms of the verbal prefixes niŋ, piŋ, and toŋ discussed in section 4.1.2.1.1 above.)

/mo?/ + /ale?/ --> /mo?ale?/ 'to garden'
/mo?/ + /tokol/ --> /motokol/ 'to lie down'
/poo?/ + /ala/ --> /poo?ala/ 'to take from each other'
/poo?/ + /pool/ --> /poopool/ 'to hit each other'

4.1.2.4 Consonant loss in /p/-initial verb bases

When the set of verbal prefixes mVŋ, nVŋ, and pVŋ, precede a verb base which begins with the obstruent /p/, the /p/ is deleted after triggering the nasal assimilation noted above.[16] This feature is also true for miŋ, niŋ, and piŋ (but not toŋ; cf. /tompiile?/ above, section 4.1.1).

/nVŋ/ + /piile?/ --> /mimiile?/ 'to see'
/miŋ/ + /pikirawar/ --> /mimikirawar/ 'to ask'
/mVŋ/ + /poloopi/ --> /momoloopi/ 'to bathe'

4.2 Vowel alternations

4.2.1 Vowel harmony

The vowels of the set of verbal prefixes mVŋ, nVŋ, and pVŋ exhibit vowel harmony with the first vowel of the following verb stem.[17] This is true whether the prefix is two syllables (cf. section 4.2.2) or one. This is an example of regressive assimilation, i.e. a following morpheme determines the shape of a preceding morpheme. (We will note in section 4.3 an example of vowel harmony which is progressive assimilation.)

We have chosen the morphophonemic symbol V to represent all the vowels which can occur in this position since selection of any one base form seems entirely arbitrary. (See 4.1.1 for examples of this phonological process.)

4.2.2 Vowel insertion (epenthesis)

We noted in 4.1.2.1.1 that no nasal-sonorant sequences occur within Balantak morphemes--for the prefixes described there, the strategy was to delete the nasals. When the set of verbal prefixes mVŋ, nVŋ, and pVŋ precede sonorant-initial verb stems, a vowel identical to the first vowel of the prefix (and of the verb stem) is added to the prefix, making it two syllables and separating the nasal and sonorant consonants.

/mVŋ/ + /wawau/ -- /maŋawawau/ 'to do'
/mVŋ/ + /memel/ -- /meŋememeli/ 'to cool'
/mVŋ/ + /limba?/ -- /miŋilimba?/ 'to move'
/mVŋ/ + /roŋor/ -- /moŋoroŋor/ 'to hear'
/mVŋ/ + /yuŋgot/ -- /muŋuyuŋgot/ 'to shake'

These same verb stems can be prefixed with nVŋ and pVŋ to give the corresponding forms.

4.3 Second person singular pronoun

Several different phonological processes may occur at once within the second person singular pronoun morpheme. In order to give a clearer overall presentation of this complex morpheme, we present the processes together here.[18] (Note that they are similar to the processes described in sections 4.2.1, 4.2.2--in this case, consonant epenthesis, not vowel epenthesis, and 4.1.2.) We present first of all the following examples, followed by our analysis. The discussion below will refer to them by number.

1) /tama/ + /Vm/ --> /tamaam/ 'your father'
2) /tambue/ + /Vm/ --> /tambueem/ 'your green beans'

3)	/kopi/ + /Vm/	--> /kopiim/	'your coffee'
4)	/tigo/ + /Vm/	--> /tigoom/	'your tobacco'
5)	/apu/ + /Vm/	--> /apuum/	'your fire'
6)	/palaa/ + /Vm/	--> /palaawam/	'your palm'
7)	/see/ + /Vm/	--> /seewem/	'your odor'
8)	/kasabii/ + /Vm/	--> /kasabiiwim/	'your cassava'
9)	/opuu/ + /Vm/	--> /opuuwum/	'your egg'
10)	/suloo/ + /Vm/	--> /suloowom/	'your heart'
11)	/balaaŋ/ + /Vm/	--> /balaawaŋ/	'your palm stem'
12)	/weer/ + /Vm/	--> /weewer/	'your water'
13)	/roon/ + /Vm/	--> /roowon/	'your banana leaf'
14)	/bako/ + /on/ + /Vm/	--> /bakoowon/	'cut by you'
15)	/tuur/ + /Vm/	--> /tuuwur/	'your knee'
16)	/sarat/ + /Vm/	--> /saraat/	'your foot'
17)	/wewer/ + /Vm/	--> /weweer/	'your lips'
18)	/witis/ + /Vm/	--> /witiis/	'your calf-of-leg'
19)	/suap/ + /on/ + /Vm/	--> /suapoon/	'burned by you'
20)	/popurun/ + /Vm/	--> /popuruun/	'your sago'
21)	/waaʔ/ + /Vm/	--> /waaʔam/	'your ear infection'
22)	/aleʔ/ + /Vm/	--> /aleʔem/	'your garden'
23)	/oriiʔ/ + /Vm/	--> /oriiʔim/	'your poles'
24)	/bakokoʔ/ + /Vm/	--> /bakokoʔom/	'your knife'
25)	/bauʔ/ + /Vm/	--> /bauʔum/	'your pig'

The morpheme Vm is a suffix for word bases ending with a vowel, and an infix for word bases ending with a consonant--except for glottal, discussed further below. (The word base may be either a noun or a verb with the goal focus/irrealis suffix on; cf. 14,19.) The morpheme always follows immediately after the final vowel of the word base.

The phonological process which occurs in all variants of this morpheme is vowel harmony. In contrast to the previous instance of vowel harmony, this is an example of progressive assimilation, i.e. a preceding morpheme determines the shape of a following morpheme. However, this generalization holds for the two instances of vowel harmony in Balantak: the vowel of the affixes involved always agrees with the nearest vowel in the word stem.

The base form Vm has a relatively restricted environment: following nouns ending with a single vowel or two vowels which are not identical (cf. 1-5).

When a noun ends with contiguous vowels which are identical (cf. 6-10), or when two identical contiguous vowels precede the final consonant (cf. 11-15), the phonological process of consonant insertion (epenthesis) applies to the morpheme. The voiced labio-velar semivowel /w/ is inserted before the vowel of the morpheme. This insertion prevents a sequence of three identical vowels which are not found elsewhere in either morphemes or words.

When word bases are consonant final, regardless of whether the consonant is preceded by two identical vowels (cf. 11-15) or by a single vowel (cf. 16-20), the phonological process of consonant loss occurs in the morpheme; in this case, the nasal /m/ is deleted. This deletion prevents a sequence of consonants from ending a syllable; such sequences are not found elsewhere in the language. When consonant loss applies and consonant insertion does not apply (cf. 16-20), the shortest variant of the morpheme, a single vowel, is manifested.

The three phonological processes (vowel harmony, consonant insertion, and consonant loss) which apply to this morpheme can be manifested in different combinations. Vowel harmony occurs in all variants; in the base form it is the only phonological process which applies (cf. 1-5). Alternatively, vowel harmony can be combined with consonant insertion only (cf. 6-10), or with consonant loss only (cf. 16-20), or all three may apply in the same variant (cf. 11-15); the result is four distinct variants for the morpheme, all phonologically conditioned.

Finally, as noted above, glottal-final nouns are an exception to consonant-final stems; where we would expect an infix, a suffix occurs instead (cf. 21-25). These data support what has been shown from other

languages; that is, that glottal patterns differently than oral cavity consonants.

4.4 Summary

We have noted a veriety of phonological processes involving both consonants and vowels. Balantak phonotactic constraints, while in a strict sense applying only within the morpheme, seem in many instances to carry over and provide motivation for alternations at morpheme junctures.

The base forms of all prefixes noted here are consonant-final, either glottal or nasal. All prefixes maintain their base form before vowel-initial stems. Prefixes ending in glottal stop always delete the glottal stop before all consonant-initial stems. Prefixes ending in a nasal have more options; when preceding obstruents, they assimilate in point of articulation to the following obstruent; when preceding sonorants, they become vowel-final either by adding another vowel or deleting the nasal.

Suffixes or clitics which are consonant-initial in their base form may be altered by a coalescence of that initial consonant with the final consonant of the word stem just when the two are identical. When they are not identical, consonant sequences not found in morphemes or at prefix junctures may occur.

The suffix/infix Vm, in addition to vowel harmony, manifests phonological processes which prevent vowel or consonant sequences not allowed phonotactically within morphemes.

NOTES

1. The data for this paper were gathered by the authors primarily in Dolom village (00°43' S 132°22' E), Balantak Subdistrict (Kecamatan), Banggai District (Kabupaten), Central Sulawesi, as part of the Balantak Field Program initiated in December, 1981, under the auspices of the Cooperative Program between Hasanuddin University and the Summer Institute of Linguistics.

We are indebted to Kenneth Gregerson and Timothy Friberg, particularly, for their assistance with the phonological and morphophonological analysis respectively. Other colleagues, including René van den Berg, James Sneddon, and Donald Burquest have also read and commented on drafts of this paper, and we express our sincere appreciation to them as well. Shortcomings still remaining in this paper are the responsibility of the authors.

Finally, we gratefully acknowledge the help of all the people of Dolom and the surrounding area, many of whom have helped us to learn their language better, but particularly the help of Marsion Biathan, who helped us during the early months of our initial analysis.

2. See Busenitz, R., ms., for further discussion of Balantak dialects.

3. Note in following examples that monosyllabic words do occur, but they are restricted to a small number.

4. No more than two prefixes together have been noted; therefore, in effect, secondary stress always falls on the first prefix.

5. In the matter of stress, prefixes rather than suffixes, function more like words; however, we will note in the discussion of morphophonemics below that prefixes have phonotactic restrictions similar to those found intramorphemically while (some) suffixes exhibit features like those found across word boundaries.

6. Contrasts are specifically indicated in only a few instances (viz. /k/, /ʔ/, /w/, /y/, and nasals); the reader will note other contrasts from scanning the data.

7. Note in section 3.2.5 below a feature of nasal neutralization.

8. Saluan, a neighboring language in the same sub-group, does have prenasalized stops which occur word finally as well as word initially and word medially (Cecilia Brown, personal communication).

9. See Busenitz, M., ms., for a discussion of Balantak demonstratives, locationals, and directionals.

10. Results of a tapping test (where native speakers were asked to tap the syllables of a word) were mixed. It seems clear that in normal speech, at least, the nasal does not receive syllable status, but in deliberate speech, particularly for the shortened verbal forms, some question arose as to the syllabic status of the nasal. We conclude that it is not normally viewed as having syllable status.

11. We give a general gloss for all the examples, but do not attempt in this paper to discuss the meaning and function of the grammatical morphemes cited; our analysis of some affixes is tentative and awaits further investigation. See Busenitz, R., 1987, for discussion and further examples of the verbal focus affixes, mVŋ-, nVŋ-, -on, and niʔ-.

12. Other counters also exhibit this feature of nasal assimilation (and loss, as dicussed in 4.1.2.1.1), but not as consistently as the counter saŋ- 'one.' Other counters with this feature are ruaŋ- 'two,' toluŋ- 'three,' limaŋ- 'five,' pituŋ- 'seven,' waluŋ- 'eight,' and sioŋ- 'nine.'

13. We were first alerted to this feature when language assistants began writing Balantak. We now suggest writing these identical consonant sequences, following Indonesian, as in rusakkan or pendekkan. (Some varieties of Indonesian coalesce this sequence of glottal stop plus velar stop or velar stop plus velar stop to a single velar stop.)

14. Note that some instances of nasal loss involving /ŋ/ in prefixes and /ŋ/ and /n/ in suffixes as described in sections 4.1.2.1.1 and 4.1.2.1.2 respectively can also be viewed as coalescence of geminate consonant sequences.

15. Examples are not given here, but these suffixes (and clitics) as well frequently produce other than nasal-obstruent sequences.

16. Note in Indonesian that three of the voiceless stops, /p, t, k/, are deleted when they are stem-initial and preceded by the verbal prefix meŋ-. (The only exception is the Indonesian prefix per-, as in memperbaiki, or memperkuat.) It may be that Balantak is in the process of shifting towards or away from Indonesian in this instance.

There are instances in Balantak where the initial /p/ is not deleted; this particular feature needs further study.

17. This feature of vowel harmony is not as complete in some locations of the Lamala subdistrict; rather, the vowels of this set of prefixes appear to be limited to /a/ and /o/. Further investigation is necessary.

18. I am indebted to S.D. Galala for clarifying my understanding of the variants of this affix, and to Timothy Friberg for determining the base form which has motivation for alternations.

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