PHONOLOGY OF PITU ULUNNA SALU

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UNHAS-SIL

TABLE OF CONTENTS

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LIST OF TABLES

Table

LIST OF PHONOLOGICAL PROCESSES

ABBREVIATIONS AND SYMBOLS

C	–	consonant
CAUS	–	causative
EMP	–	emphatic
IMPF	–	imperfective
LOC	–	locative
PRF	–	perfective
PRT	–	particle
Q	–	question
S	–	syllable
UN	–	uncertainty
V	–	vowel
1	–	first person
2	–	second person
3	–	third person
du	–	dual
ex	–	exclusive
in	–	inclusive
s	–	singular
pl	–	plural
#	–	word boundary
–	–	morpheme boundary
*	–	disallowed form
/ /	–	(morpho–)phonemic transcription
[ ]	–	phonetic transcription
{ }	–	one of two or more alternates
( )	–	optional

1. INTRODUCTION

Pitu Ulunna Salu (PUS), an Austronesian language, is a member of the Pitu Ulunna Salu subfamily in the Northern South Sulawesi language family. PUS (alternately known as Bambam or Bambang) is spoken by some 22,000 speakers in South Sulawesi. Most speakers of PUS live in the district of Mambi of the regency Polewali–Mamasa. This study reflects the phonology of the Salumokanam dialect of PUS. Salumokanam is the dialect spoken in the eastern part of sub–district Rantebulahan. The field work leading to this paper was done in the village of Tanete.

2. SEGMENTALS

2.1 Phones and Phonemes

In this section I will list the PUS phones and underlying phonemes.

2.1.1 Phone Chart

The following phones are present in PUS:

Table 1.—PUS Phones

Contoids:

	labial	alveolar	alveo-palatal	velar	glottal
stops					
vl	p	t		k	?, ^[1]
vd	b	d		g	
affricate			dž		
fricative					
vl		s			h
vd	ƀ[2]				
nasal	m	n		ŋ	
lateral		l			

[1]The symbol ^ is used to indicate a rearticulation of a vowel sound. In such cases the vowel is not a lengthened vowel, nor are the two vowels separated by a full glottal stop, e.g., /oo/ —> [o ^ o] 'again'.

[2]While the bilabial fricative is found in the Salumokanam dialect, other dialects of PUS have a corresponding [b] or [w]. (See discussion of dialects in Strømme.)

Vocoids:

		front	central	back
high		i		u
mid	tense	e		o
	lax	ɛ	ə	
low		æ		a

2.1.2 Chart Of Phonemes

Underlying the aforementioned phones are fourteen consonant phonemes and six vowel phonemes:

Table 2.—PUS Phonemes

Consonants:

	labial	alveolar	back
stops			
voiceless	p	t	k
voiced	b	d	g
affricate		j[3]	
fricatives	ƀ	s	h
nasals	m	n	ŋ
lateral		l	

Vowels:

	front	back
high	i	u
mid	e	o
low	æ	a

One of the unusual features of PUS phonology is the presence of the phoneme /æ/. To my knowledge, this phoneme is not found in South Sulawesi outside of the Pitu Ulunna Salu subfamily. Refer to the appendix for a presentation on the phoneme /æ/.

[3]In this paper the consonant dž is symbolized as 'j'.

2.1.3 Feature Matrix

Following are the fully specified feature matrices for PUS segments:

Table 3.—Feature Matrices

Consonants:	p	t	k	b	d	g	j	m	n	ŋ	l	ƀ	s	h
syllabic	-	-	-	-	-	-	-	-	-	-	-	-	-	-
consonantal	+	+	+	+	+	+	+	+	+	+	+	+	+	-
continuant	-	-	-	-	-	-	-	-	-	-	+	+	+	+
nasal	-	-	-	-	-	-	-	+	+	+	-	-	-	-
anterior	+	+	-	+	+	-	-	+	+	-	+	+	+	-
coronal	-	+	-	-	+	-	+	-	+	-	+	-	+	-
voiced	-	-	-	+	+	+	+	+	+	+	+	+	-	-

Vowels:	i	e	æ	a	o	u
syllabic	+	+	+	+	+	+
high	+	-	-	-	-	+
low	-	-	+	+	-	-
back	-	-	-	+	+	+

2.2 Interpretation

2.2.1 Consonant vs. Vowel

The high vowels i̲ and u̲ are always interpreted as vowels, not semivowels. There are no phonemic semivowels in PUS. The only semivowels present are allophones of /i̯/ and /u/. These allophones occur when preceding a stressed vowel. In this environment /i/ —> [y] and /u/ —> [w]. For example: /iolo/ —> [yólo] 'first'; /uase/ —> [wáse] 'axe'. This process only occurs in a few words.

2.2.2 Sequence vs. Unit

There are no ambiguous CC patterns found within the syllable in PUS words. The consonant d̲ž is interpreted as a unit, not as a stop–fricative sequence. This consonant is symbolized by 'j'.

2.3 Description of Phonemes

2.3.1 Consonant Phonemes

In the following list the consonant phonemes are shown word initially, medially and finally.

Table 4.—Positions of Consonant Phonemes

/p/	initial	/pahe/	[páhe]	'rice plant'
	medial	/api/	[ápi]	'fire'
/t/	initial	/tedom/	[tédom]	'water buffalo'
	medial	/pitu/	[pítu]	'seven'
/k/	initial	/kaluku/	[kalúku]	'coconut'
	medial	/iko/	[íko]	'you'
	final	/ulak/	[úla?]	'snake'
/b/	initial	/babi/	[bábi]	'pig'
	medial	/tibak/	[tíba?]	'kitchen knife
/d/	initial	/daham/	[dáham]	'horse'
	medial	/buda/	[búda]	'many'
/g/	initial	/gaɓum/	[gáɓum]	'fog'
	medial	/sahigam/	[sahígam]	'bed'
/j/	initial	/joŋa/	[jóŋa]	'deer'
	medial	/kaju/	[káju]	'wood'
/s/	initial	/sola/	[sóla]	'friend', 'with'
	medial	/isi/	[ísi]	'tooth'
/ɓ/	medial	/uɓe/	[úɓe]	'rattan'
		/baɓi/	[báɓi]	'pig'
/h/	initial	/hiɓuk/	[híɓu?]	'wind'
	medial	/uham/	[úham]	'rain'
/m/	initial	/makalek/	[makále?]	'tomorrow'
	medial	/temo/	[témo]	'now'
	final	/tedom/	[tédom]	'water buffalo'
/n/	initial	/nene/	[néne]	'grandparent'
	medial	/mænek/	[mæne?]	'chicken'
/ŋ/	initial	/ŋahaŋaha/	[ŋahaŋáha]	'lie on back'
	medial	/beŋi/	[béŋi]	'night'
/l/	initial	/lante/	[lánte]	'mat'
	medial	/sule/	[súle]	'come'

2.3.2 Vowel Phonemes

The following list shows the vowel phonemes and demonstrates each in positions noncontiguous with other vowel phonemes.

Table 5.—Positions of Vowel Phonemes

/i/	1st syll	/ihuk/	[íhu?]	'to drink'
		/illæ/	[íllæ]	'nose'
		/piham/	[píham]	'when'
	2nd syll	/moni/	[móni]	'noise'
		/beŋi/	[béŋi]	'night'
/e/	1st syll	/melok/	[mélo?]	'want'
		/belak/	[béla?]	'garden'
		/tettek/	[tɛ́tte?]	'hour'
		/kessi/	[kɛ́ssi]	'with contents'
	2nd syll	/lante/	[lánte]	'mat'
		/sule/	[súle]	'come'
		/kabem/	[kábɛm]	'married'
/æ/	1st syll	/sædæ/	[sǽdæ]	'mouth'
		/hættuk/	[hǽttu?]	'popcorn'
		/mænek/	[mǽne?]	'chicken'
	2nd syll	/tontæm/	[tóntæm]	'same'
		/lempæ/	[lɛ́mpæ]	'turn'
		/issæ/	[íssæ]	'rice mortar'
/u/	1st syll	/ulak/	[úla?]	'snake'
		/uɓe/	[úɓe]	'rattan'
		/tuɓo/	[túɓo]	'to live'
	2nd syll	/asu/	[ásu]	'dog'
		/pitu/	[pítu]	'seven'
/o/	1st syll	/tondæk/	[tóndæ?]	'village'
		/bosi/	[bósi]	'rotten'
		/golla/	[gólla]	'sugar'
	2nd syll	/temo/	[témo]	'now'
		/ampo/	[ámpo]	'grandchild'
/a/	1st syll	/mane/	[máne]	'before'
		/dakok/	[dáko?]	'later'
		/hambu/	[hámbu]	'smoke'
	2nd syll	/biŋa/	[bíŋa]	'deaf'
		/umba/	[úmba]	'which'

2.4 Phoneme Contrast

In the following sections I will present examples of contrasts between phonetically similar phonemes.

2.4.1 Contrast of Consonant Phonemes

/p/ vs. /b/	/paha/	[páha]	'rack'
	/baham/	[báham]	'thing'
	/ampak/	[ámpa?]	'mat'
	/ambek/	[ámbe?]	'father'
/p/ vs. /ɓ/	/sapok/	[sápo?]	'except'
	/iaɓo/	[yáɓo]	'above'
/b/ vs. /ɓ/	/habu/	[hábu]	'Wednesday'
	/taiaɓu/	[taiáɓu]	'dust, ashes'
/t/ vs. /d/	/daum/	[dáum]	'leaf'
	/taum/	[táum]	'year'
	/buda/	[búda]	'many'
	/buta/	[búta]	'blind'
/t/ vs. /j/	/tumak/	[túma?]	'louse'
	/jumak/	[júma?]	'Friday'
	/batu/	[bátu]	'rock'
	/baju/	[báju]	'shirt'
/d/ vs. /j/	/dukak/	[dúka?]	'also'
	/jumak/	[júma?]	'Friday'
	/pada/	[páda]	'same size'
	/dibaja/	[dibája]	'to weed'
/j/ vs. /s/	/kaju/	[káju]	'wood'
	/asu/	[ásu]	'dog'
/k/ vs. /g/	/kahapa/	[kahápa]	'almost'
	/gahaktak/	[gahátta?]	'paper'
	/lako/	[láko]	'to over there'
	/lago/	[lágo]	'spouse of ego's spouse's sibling'
/m/ vs. /n/	/menna/	[mɛ́nna]	'who'
	/nene/	[néne]	'grandparent'
	/tene/	[téne]	'urine'
	/temo/	[témo]	'now'

/m/ vs. /ŋ/	/mahomaho/	[mahomáho]	'naughty'
	/ŋahaŋaha/	[ŋahaŋáha]	'lie on back'
	/tama/	[táma]	'enter'
	/saŋa/	[sáŋa]	'name'
/n/ vs /ŋ/	/nek/	[néˆe?]	'down'
	/ŋei/	[ŋéi]	'place'
	/denak/	[déna?]	'sparrow'
	/seŋak/	[séŋa?]	'different'
/n/ vs /l/	/mane/	[máne]	'just, before'
	/bale/	[bále]	'meat'

2.4.2 Contrast of Vowel Phonemes

/i/ vs /e/	/ita/	[íta]	'see'
	/eta/	[éta]	'here'
	/tidom/	[tídom]	'irreversible deed'
	/tedom/	[tédom]	'water buffalo'
	/adi/	[ádi]	'younger sibling'
	/ate/	[áte]	'liver'
/e/ vs /æ/	/melok/	[mélo?]	'desire'
	/mænek/	[mǽne?]	'chicken'
	/tille/	[tílle]	'a type of grass'
	/illæ/	[íllæ]	'nose'
/æ/ vs /a/	/kadok/	[kádo?]	'I'
	/kædok/	[kǽdo?]	'to latch'
	/assa/	[ássa]	'it depends on'
	/issæ/	[íssæ]	'rice mortar'
/o/ vs /u/	/olo/	[ólo]	'in front'
	/ulu/	[úlu]	'head'
	/ponto/	[pónto]	'bracelet'
	/punti/	[púnti]	'banana'
	/aso/	[áso]	'young boy'
	/asu/	[ásu]	'dog'

3. SUPRA SEGMENTAL CONSIDERATIONS

3.1 Stress

Stress in PUS is not phonemic. It normally occurs on the penultimate syllable of words or on the nucleus of the rare one–syllable roots.[4] The addition of any suffixes to the word (thus making a new word) affects the placement of stress; that is, it causes the stress to shift to the right. The suffixes are: the possessive suffixes on nouns (–ku, 1s; –mu, 2s; –na, 3s,3pl; –ki, 1 dual exclusive; –ta, 1 dual inclusive) and the derivational suffixes –am and –i. The exception to the regular stress rule is in the case of vocatives. Vocatives are always stressed on the last syllable as in /ati/ —> [atí] (girl's name). The vocative stress rule occurs before the regular stress rule. The stress placement rule applies only if the last syllable is unstressed. Therefore, a word which receives vocative stress will not undergo stress placement.

```
(1) Vocative stress:

        S ---> [+stress] / ____      ] #
                                   vocative word
```

```
(2) Stress placement:

        S ---> [+stress] / ____      S       ] #
                                 [-stress]
                                           word
```

The stress placement rule is not iterative. Therefore, it will first look for the penultimate syllable and stress it.

```
(3)    a. /daham-ku/  -->   [dahánku]        'my horse'
       b. /piso-mu/   -->   [pisómu]         'your machete'
```

Only if there is not a penultimate syllable, i.e., when the word has only one syllable, will the shorter version of the rule apply.

```
(4)    a. /to/        -->   [tó]             'which, that'
       b. /le/        -->   [lé]             'OK'
```

In contrast to penultimate stress I find that there are several clitics in PUS which, when following a word, do not affect the stress placement on the word. Two factors identify morphemes as clitics in PUS. First of all, clitics, unlike suffixes, are mobile. Verbal clitics, for example, can attach to the end of a verb or to the end of a verb modifier, be it pre–verbal or post–verbal. Clitics are attached in a particular order. For example, the plural clitic –ak attaches to a stem after all

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[4] PUS syllable structure will be discussed in 4.1.

other suffixes and clitics are attached. Therefore, other constituents can come between -ak and the stem to which it normally attaches. The second defining feature of clitics is that they do not affect the stress of the stem to which they attach.

The most common of these clitics are the pronominal clitics which follow the predicate. These are the absolutive pronominal clitics in an ergative pronominal system. These absolutive clitics function as subject person markers in intransitive or antipassive clauses, object person markers in transitive clauses, or indirect objects in bitransitive clauses.

(5) a. /um-tibe-æk/ --> [untíbeæ?] 'I throw (it).'
b. /ku-dæŋguk-ko/ --> [kudǽŋgu?ko] 'I hit you.'

The clitic -e is a noun phrase particle (PRT) which possibly indicates referentiality of the noun.

(6) /lao-ko bawa inde dokko banua-mu -e/
go-you carry this down house-your-PRT
[láoko báwa índe dókko banuámmue]
'Go take this down to your house.'

The clitic -o is also a noun phrase particle (PRT).

(7) /aka illauk ampek bakba-o/
what downstream next to door -PRT
[áka illáu? ámpe? bá?bao]
What is next to the door?

The clitic -i is an emphasis marker.

(8) /pa- elak-i/ ---> [paéla?i] 'go slowly!'
CAUS-slow-EMP

Perfective -mi and imperfective -pi are also clitics.

(9) /uham-mi/ ---> [úhammi] 'already raining'
rain-PRF

/taum pole-pi/ ---> [táum pólepi] 'next year'
year next-IMPF

The uncertainty clitic –hi is used in declaratives and interrogatives.

(10) /ma- aka-hi anna susi-i/
INT-why-UN-CONT-like-LOC
[maˆákahi ánna súsii]
'Why is it like that?'

The clitic –ka is used with yes–no questions (here used in conjunction with –hi).

(11) /allo sattu -hi-ka temo/
day Saturday-UN-Q now
[állo sáttuhaka témo]
'Is today Saturday?'

The plural clitic –ak appears after verbs and possessed nouns.

(12) /ta- tuhuk -ak/
1plin-follow-pl
[tatúhu?a?]
'let's all go together'

/mænek -mu-ak/
chicken-2s-pl
[mæné?mua?]
'your (pl) chicken'

3.2 Intonation

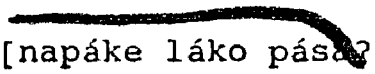
3.2.1 Sentence Level Intonation

Generally, PUS questions end with rising intonation which begins on the stressed syllable of the last word. This applies both to content questions and yes–no questions. Statements and imperatives have falling intonation. The exceptions to these are imperatives ending with tags or vocatives. In these cases, after falling, the intonation rises sharply on the final word. A request has the same syntactic structure as an imperative but with rising intonation at the end.

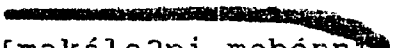
Statements:

[nakéke? ehoého etáŋku índe] A wasp stung me here.

[laláoæ? mekáju] I'm going to get firewood.



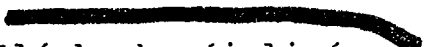
[napáke láko pásâ?] They use it at the market.



[makále?pi mebéŋŋi?] Tomorrow morning.

[laláoæ? muálli tédom mésâ] I'm going to buy a water buffalo.

Imperatives:



[láoko baséi limámmu] Go wash your hands.

[poniáŋkia? ítih hadíoo] Play that radio for us.

Imperatives with vocatives or tags:

[petúa?i dássi lé guná?] Look at the bird, Guna'!

[puhái índe pakúli lé] Finish off this medicine, OK!

Requests:

[peǽmpæ? mátim] Would you look for it there?

[bémmæ? kuálli tállu sá?bu] How about if I buy it from you for three thousand?

Yes-no questions:

[ladékkehokoka salulémo] Will you go to Salulemo?

[indómuhaka díoˆo] Is that your mother?

[démmokoka íko keǽnæ?] Do you already have children?

Content questions:

[ménna muálli dío dáhanno] Who bought that horse?

[píhampoko me?gúhu] When will you study?

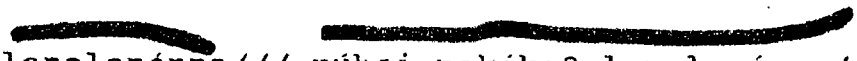
[umbaŋéi belá?mu] Where is your garden?

[áka ítim muánde] What are you eating?

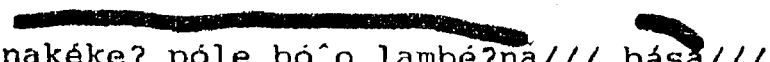
3.2.2 Higher Level Intonation

In texts there are three phonological levels. The first level, P1, is defined by slight falling intonation and a short pause. The next higher level, P2, is defined by rising intonation following the word stress on the final word, and a short pause. The highest level, P3, is defined by sharp falling intonation following the word stress on the final word, and a long pause. The following text demonstrates all three levels. The text below consists of four phonological sentences (P3) as shown by ///. The P2 and P1 levels are indicated by // and / respectively.

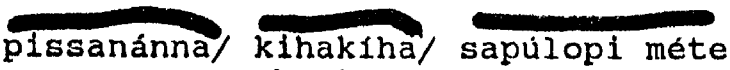
[máne naˆájo lanabátta// táhhu? nakéke?
  just plan to cut right away it bit



leŋoleŋónna/// púhai nakéke? leŋoleŋónna//
his wrist after it bit his wrist



nakéke? póle bóˆo lambé?na/// básа///
it bit again his calf injured



pissanánna/ kihakíha/ sapúlopi méte?
now about ten more meter

takulambí?na// ia sía lakubunóna//
not reach it for sure I will kill it

lé?ba? ó^o lumúmpa? índo bábi//
go again run that pig

ía tæ? mála kubúno///]
well not able I kill

Just when he intended to stab (it)// it immediately bit his wrist/// After biting his wrist// it bit him again on his calf/// (He was) injured/// Now/ about/ ten meters before I could reach it// after I'd decided to kill it// that pig ran off again// well I wasn't able to kill (it)///

4. DISTRIBUTION

4.1 Syllables and Phonological Words

In PUS each vowel constitutes the nucleus of a syllable. No consonant clusters occur within the syllable. The following structure formula expresses the possible syllable configurations:

(13) ([-syllabic]) [+syllabic] ([-syllabic])

The above formula states that a syllable may begin with a consonant or a vowel and may also end with a consonant or a vowel, making possible the four following structures: V, CV, VC, and CVC. There are four possible syllable divisions within word bases in PUS: V/V, V/CV, VC/CV, and VC/V. These divisions conform to the possible juxtaposed syllable patterns within phonological words:

(14)	a. V.V	/u.a.se/	'axe'
	b. V.CV	/a.ka/	'what'
	c. V.CVC	/a.dek/	'say'
	d. VC.CV	/um-.ba.luk/	'sell'
	e. VC.CVC	/al.lak/	'difference'
	f. CV.V	/la.o/	'go'
	g. CV.VC	/ka.lu.ak/	'broad'
	h. CV.CV	/ma.te/	'dead'
	i. CV.CVC	/to.bam/	'coop'
	j. CVC.V	/mak-.o.to/	'go by car'
	k. CVC.VC	/mak-.al.lak/	'different'
	l. CVC.CV	/um-.si-.pak-.tu.lak-.am/	'talk with'
	m. CVC.CVC	/bah.hak/	'hulled rice'

So we see that while there exist no consonant clusters within the syllable, we do encounter them at syllable boundaries. Generally, within words, a closed syllable can precede another syllable only if the following syllable opens with a consonant. This means that single consonants are syllable onsets or word final. The exception to this (see examples 14j and 14k) is morpheme final /k/ which is pronounced [?]. The phoneme /k/ remains as the coda of the syllable regardless of whether a vowel

or consonant follows. This applies equally to prefixes and to words which precede a vowel-initial suffix or a clitic. In the case of the latter there are also two additional pairs of juxtaposed syllable patterns not found elsewhere:

(15)	a. V.VC	/am.pa.-i.-æk/	'Wait for me.'
	b. VC.V	/mak.ba.se.-æk.-i/	'I'm dish-washing.'

One-syllable words are seldom encountered. The words /bu/ 'smell', /tæk/ 'no, not' (which in isolation is pronounced [tǽ æʔ]) and the tag word /le/ 'OK' are rare exceptions. While *words* of up to 7 syllables have been observed (/la.ku.peŋ.ki.la.la.i/ 'I will remember it'), I have yet to find a *morpheme* consisting of more than 4 syllables. By far, the majority of PUS root or free morphemes consist of 2 syllables as shown below:[5]

(16)	1 syllable morphemes	1%
	2 syllable morphemes	77%
	3 syllable morphemes	19%
	4 syllable morphemes	3%

4.2 Consonants

All consonant phonemes can fill the onset position of the syllable. While all consonants can fill the syllable initial position, morpheme initial /j/, /n/, /ŋ/ and /ɓ/ rarely occur. Over 85% of PUS morphemes begin with consonants. Almost 85% of these consonant-initial morphemes start with (in order of number of occurrences) /b/, /t/, /s/, /k/, /p/, or /l/.

All consonant phonemes with the exception of /j/ (which rarely occurs anywhere in the language) can also fill the coda position of the syllable. While all syllables can fill these positions, there are co-occurrence restrictions. The only consonant clusters within morphemes consist of voiceless stop, continuant, and nasal geminates; combinations of a nasal and a following stop; and /k/ followed by a voiced stop or /l/. Therefore, only the following intramorphemic clusters occur: pp, tt, kk, ll, ss, hh, ɓɓ, mm, nn, ŋŋ, mp, nt, ŋk, mb, nd, ŋg, kb, kd, kg, and kl.

[5]These figures are approximates only, as they are based on a limited random word list of about 300 entries.

Intramorphemic consonant clusters:

/pp/	/appak/	[áppa?]	'four'
/tt/	/patti/	[pátti]	'box'
/kk/	/tikkala/	[tikkála]	'pineapple'
/ll/	/dalle/	[dálle]	'corn'
/ss/	/bossik/	[bóssi?]	'wet'
/hh/	/tahhuk/	[táhhu?]	'continue'
/ƀƀ/	/labƀa/	[lábƀa]	'sky'
/mm/	/mammak/	[mámma?]	'sleep'
/nn/	/ponno/	[pónno]	'full'
/ŋŋ/	/dihiŋŋi/	[dihíŋŋi]	'hear'
/mp/	/ampo/	[ámpo]	'grandchild'
/nt/	/punti/	[púnti]	'banana'
/ŋk/	/siŋkum/	[síŋkum]	'cubit'
/mb/	/tambim/	[támbim]	'room'
/nd/	/tanduk/	[tándu?]	'horn'
/ŋg/	/sidæŋguk/	[sidǽŋgu?]	'to box'
/kb/	/bakba/	[bá?ba]	'door'
/kd/	/sakde/	[sá?de]	'side'
/kg/	/ditakgak/	[ditá?ga?]	'trade for field use'
/kl/	/laklam/	[lá?lam]	'umbrella'

Phonemes /k/ and /m/ are the only word-final consonant phonemes. On the surface level these word-final phonemes become [ʔ] and [m] respectively. In section 5 I will show that /k/, /m/ and /ŋ/ are the only morpheme-final consonants in PUS. The phoneme /ŋ/ occurs morpheme final in some prefixes.[6] I will argue, for example, that there are rules which generate various forms of the morpheme maŋ- so that we encounter surface manifestations such as [mam], [maŋ], [mal], [mas], and [mah] as determined by the following consonant.

Just as we encounter intermorphemic alternations such as /um-lappak/ —> [ulláppa?] 'to let go', we also encounter similar phonological changes between words. Thus we find /læŋæm#læntæ/ —> [lǽŋællǽntæ] 'go up to the garden house'. Note that both intermorphemically and inter-word we find /m/ —> [l] when followed by /l/. Based on these observations, one could extrapolate the findings and make claims about phonological processes within the morpheme. Within a morpheme I have never found, for example, a consonant cluster of *[ml]. However, the cluster of [ll] as in [dálle] 'corn' does occur. Therefore, one could posit an underlying form of */damle/ and argue that the same process of /m/ —> [l] when followed by /l/ also occurs within the morpheme. Following this line of reasoning, one could then state that the only syllable final consonant phonemes in PUS are /k/, /m/ and /ŋ/ and that there are rules which occur within and between morphemes to change the underlying forms to their surface counterparts. However, there is no proof that words such as [dálle] have an underlying form */damle/. Paul Kiparsky (1968:12) writes, "morphemes which are always phonetically identical must have the same underlying representations." Kiparsky argues against overly abstract representations which never occur on the surface. Following his argument

[6]I consider the final nasal in the prefixes maN-, meN-, peN-, paN-, and saN- to be /ŋ/, based on the form they take when preceding a vowel initial root. As will be shown under the rule ŋ-gemination, in such an environment the final nasal in each of these prefixes geminates to [ŋŋ].

I will refrain from positing intramorphemic processes when there is no internal evidence for such changes. That is why I stated above that all consonant phonemes can occur syllable final, while only /k/, /m/ and /ŋ/ occur morpheme final.

Intermorphemically, /k/ can be followed by any consonant, save /ɓ/. The absence of */kɓ/ co-occurences is due to the fact that /ɓ/ rarely is found morpheme initial. Likewise, there are no */mɓ/ or */ŋɓ/ intermorphemic sequences. The only other exceptions to intermorphemic consonant sequences involving /m/ or /ŋ/ are that no combinations of */mj/, */ŋj/, */mŋ/, or */ŋŋ/ have been observed.[7] Again, these gaps are probably due more to the rarity of the phonemes /j/ and /ŋ/ than to any phonological limitations.

Intermorphemic consonant clusters:

	p	t	k	b	d	g	l	j	s	h	ɓ	m	n	ŋ
k	kp	kt	kk	kb	kd	kg	kl	kj	ks	kh	--	km	kn	kŋ
m	mp	mt	mk	mb	md	mg	ml	--	ms	mh	--	mm	mn	--
ŋ	ŋp	ŋt	ŋk	ŋb	ŋd	ŋg	ŋl	--	ŋs	ŋh	--	--	--	--

/kp/	/mak-papia/	[ma?papía]	'make'
/kt/	/mak-tappak/	[ma?táppa?]	'wash clothes'
/kk/	/mak-katapi/	[ma?katápi]	'play guitar'
/kb/	/mak-basa/	[ma?básа]	'speak'
/kd/	/mak-doik/	[ma?dói?]	'have money'
/kg/	/mek-guhu/	[me?gúhu]	'study'
/kl/	/mak-lebak/	[ma?léba?]	'throw'
/kj/	/mak-jama/	[ma?jáma]	'repair a road'
/ks/	/mak-saleoleo/	[ma?saleoléo]	'relax'
/kh/	/mak-hogok/	[ma?hógo?]	'to smoke'
/km/	/mak-mahomaho/	[ma?mahomáho]	'fuss'
/kn/	/mak-nasu/	[ma?násu]	'cook'
/kŋ/	/mak-ŋoæk/	[ma?ŋóæ?]	'moo'
/mp/	/um-petuak/	[umpetúa?]	'to watch'
/mt/	/um-tutuk-i/	[untútu?i]	'close'
/mk/	/um-kekek/	[uŋkéke?]	'bite'
/mb/	/um-bata/	[umbáta]	'read'
/md/	/um-dæŋguk/	[undǽŋgu?]	'hit'
/mg/	/um-gahhik-i/	[uŋgáhhi?i]	'to free'
/ml/	/um-lappak/	[ulláppa?]	'let go'
/ms/	/um-sakka/	[ussákka]	'catch'
/mh/	/um-hutuk/	[uhhútu?]	'look for'
/mm/	/daham-mu/	[dahámmu]	'your horse'
/mn/	/um-nennek-i/	[unnénne?i]	'look at'

[7]Consonant sequences of /ŋŋ/ occur when ŋ-final prefixes attach to vowel initial roots as shown in (30). This is an example of ŋ-gemination which creates a sequence of [ŋŋ].

/ŋp/	/maŋ-paju/	[mampáju]	'measure'
/ŋt/	/maŋ-tulik/	[mantúli?]	'write'
/ŋk/	/meŋ-kæhæ/	[meŋkǽhæ]	'to work'
/ŋb/	/maŋ-baja/	[mambája]	'to weed'
/ŋd/	/maŋ-dasik/	[mandásɨ?]	'sew'
/ŋg/	/maŋ-gahusuk/	[meŋgahúsu?]	'to iron'
/ŋl/	/maŋ-lulum/	[mallúlum]	'roll up'
/ŋs/	/maŋ-suhak/	[massúha?]	'write'
/ŋh/	/maŋ-hekem/	[mahhékem]	'count'

4.3 Vowels

Any vowel can fill the nucleus of any of the four syllable patterns. Less than 15% of all PUS morphemes begin with a vowel. Over 80% of these vowel-initial morphemes begin with the phonemes (in order of frequency) /a/, /i/ or /u/. The six vowel phonemes can co–occur (without the intervention of a consonant) as follows:

Intramorphemically:

	i	e	æ	u	o	a
i	-̇-	--	iæ	iu	io	ia
e	ei	--	eæ	eu	eo	ea
æ	æi	æe	--	--	--	--
u	ui	ue	uæ	--	--	ua
o	oi	oe	--	--	oo	--
a	ai	--	--	au	ao	aa

/iæ/	/piæk/	[píæ?]	'break'
/iu/	/liu/	[líu]	'continual'
/io/	/dio/	[dío]	'below'
/ia/	/hombia/	[hombía]	'sago'
/ei/	/sendehei/	[sɛndehéi]	'celery'
/eæ/	/ta-deæk/	[tadéæ?]	'hungry'
/eu/	/leutam/	[leútam]	'island'
/eo/	/me-teo/	[metéo]	'to sting'
/ea/	/hea/	[héa]	'tall grass'
/æi/	/sæpæik/	[sæpǽi?]	'short duration'
/æe/	/mæsæe/	[mæsǽe]	'long time'
/ui/	/mui/	[muí]	'let, allow'
/ue/	/bue/	[búe]	'beans'
/uæ/	/kalimbuæ/	[kalimbúæ]	'spring'
/ua/	/muane/	[muáne]	'man'
/oi/	/doik/	[dói?]	'money'
/oe/	/kaloek/	[kalóe?]	'parrot'
/oo/	/took/	[tóˆo?]	'base'
/ai/	/saidik/	[saídi?]	'a little'
/au/	/bau/	[báu]	'fish'
/ao/	/kao/	[káo]	'I'
/aa/	/sa-paa/	[sapáˆa]	'a bunch (bananas)'

The intramorphemic geminates /oo/ and /aa/ and the pair /ei/ are extremely rare, each occurring only once or twice. However, when vowel geminates do occur (intramorphemically or intermorphemically) one of two things happens. Generally there is a weak glottalization (ˆ) between the two vowels, making clear rearticulation: /sapaa/ —> [sapáˆa]. In these cases penultimate stress on words such as the example above further verifies that these are true geminates, i.e., sequences of two syllables. More rarely, or in fast speech, the two vowels coalesce into one lengthened vowel. Even in these cases, however, the stress pattern acts as if there are still two distinct syllables; /illaam/ —> [illá.m] (not *[ílla.m]) 'in'.

Intermorphemically:

	i	e	æ	u	o	a
i	ii	--	iæ	iu	io	ia
e	ei	ee	eæ	eu	eo	ea
æ	æi	--	ææ	--	--	--
u	ui	ue	uæ	uu	uo	ua
o	oi	--	oæ	--	oo	oa
a	ai	ae	aæ	au	ao	aa

	/ii/	/di-issam/	[diˆíssam]	'known'
**	/iæ/	/na-hambu-i-æk/	[nahambúiæ?]	'smoke is coming at me'
	/iu/	/di-uduk/	[diúdu?]	'to smell'
**	/io/	/mai-o/	[máio]	'here'
	/ia/	/sule-i-am/	[suleíam]	'repeat'
	/ei/	/ka-mase-i-æk/	[kamaséiæ?]	'pity me'
	/ee/	/ke-eŋkok/	[keéŋko?]	'have a tail'
	/eæ/	/ke-ænæk/	[keænæ?]	'have children'
	/eu/	/me-uham-i/	[meuhánni]	'rain on'
**	/eo/	/sule-o-i/	[súleoi]	'it comes again'
	/ea/	/me-ampa/	[meámpa]	'watch over'
	/æi/	/um-ælæ-i/	[muæléi]	'remove it'
**	/ææ/	/maŋ-peæ-æk/	[maméæˆæ?]	'I search'
	/ui/	/um-tammu-i/	[untammúi]	'to meet'
**	/ue/	/taŋkihik-ku-e/	[taŋkihí?kue]	'my cup'
**	/uæ/	/liu-æk/	[líuæ?]	'I continue'
	/uu/	/ku-uduk/	[kuˆúdu?]	'I smell (it)'
	/uo/	/mu-oŋei-ak/	[muoŋéia?]	'you all stay'
	/ua/	/mu-anna/	[muánna]	'you store'
**	/oi/	/um-sahho-i/	[ussáhhoi]	'you cry about'
**	/oæ/	/lao-æk/	[láoæ?]	'I go'
**	/oo/	/iaɓo-o/	[yáɓoˆo]	'up there'
	/oa/	/ka-maho-am/	[kamahóam]	'stupidity'
	/ai/	/di-papia-i/	[dipapiái]	'to be made'
	/ae/	/ma-elak/	[maéla?]	'slow'
**	/aæ/	/ke-mesa-æk/	[kemésaæ?]	'if just me'
	/au/	/na-uham-i-æk/	[nauhánniæ?]	'I'm rained on'
**	/ao/	/bakba-o/	[bá?bao]	'that door'
	/aa/	/um-baɓa-am/	[umbaɓáˆam]	'you take for'

**The second vowel in the pair is a clitic.

As /u/ and /o/ are close phonetically, it is not surprising to find they seldom co–occur. In fact, when they do co–occur intermorphemically, generally the /u/ is deleted so that a word such as mu–okkok 'to sit' is pronounced [mókko?].

Sequences of three vowels are also very common intermorphemically. Sequences of four vowels are more rare but do occur. Sequences of more than two vowels generally involve the suffixes –am or –i or one of the vowel–initial clitics. In regular speech, however, I do find that in certain cases a vowel will be deleted. One commonly heard case is with /uua/ as heard in the words /ku–ua/ 'I say' and /mu–ua/ 'you say' which come out as [kúa] and [múa] respectively. Example (17) presents occurrences of three or more juxtaposed vowels.

(17)

/um-papia-i/	[umpapiái]	'to make (it)'
/ku-peŋ-soe-am/	[kupessoéam]	'I throw underhand'
/lao-æk/	[láoæ?]	'I go'
/ke-di-ua-i/	[kediuái]	'if to say'

4.4 Consonants and Vowels

There are no co–occurrence restrictions between consonants and vowels in PUS words. The only gaps noted are /ag/, /og/, /ej/, /ij/, /jæ/, /je/, and /ji/. These omissions are undoubtedly due to the infrequency of the phonemes /g/ and /j/ rather than any phonological restrictions.

5. PHONOLOGICAL PROCESSES

In this section I will present the various phonological processes which occur in PUS. The full meanings and usages of PUS morphemes are dealt with elsewhere (see Campbell 1989). For the present I am concerned only with phonological aspects of the language.

It was stated earlier that only the phonemes /k/, /m/, and /ŋ/ can occur morpheme final in PUS. It stands to reason then that some of the most frequent phonological processes involve these three phonemes.

When /k/ occurs syllable final the following process holds:

(18) k-weakening:

$$/k/ \quad \text{-->} \quad [?] \quad / \_\_ \quad \begin{Bmatrix} C \\ - \end{Bmatrix}$$

(19)	a.	/ulik/	[úli?]	'rope'
	b.	/bojok/	[bójo?]	'squash'
	c.	/bakba/	[bá?ba]	'door'
	d.	/mak-tulak/	[ma?túla?]	'speak'
	e.	/mak-oto/	[ma?óto]	'go by car'

Syllable final /k/ becomes [ʔ]. This process applies within the morpheme when /k/ is followed by a consonant, and before morpheme boundaries. Why do I posit /k/ as the underlying phoneme and not */ʔ/, when in fact [ʔ] occurs more frequently than [k] at the surface level? The phonemes /p,t,k/ form a natural class of [+consonantal, –continuant, –voice]. The phonemes /p,t,*ʔ/ do not form such a natural class. Also, it is more natural to consider the phoneme /k/ weakening to [ʔ] in the syllable final position than to consider the phoneme */ʔ/ strengthening to [k] in the syllable initial position. [k] occurs word and syllable initial as do [p] and [t]. Based on this natural class of stops, I have chosen to posit /k/ as the underlying phoneme rather than */ʔ/.

An exception to k–weakening is k–sibilantization, which takes place when word final /k/ is followed by the verb suffix (benefactive) –am or the nominalizer –am. In such cases, /k/ changes to [s].[8]

(20) k-sibilantization:

/k/ --> [s] / ___ - am]
suffix

(21)	a./pak-pe-tuak-am/	[paʔpetuásam]	'view'
	b./ki-tulak-am/	[kitulásam]	'we tell (him)'
	c./baluk-am/	[balúsam]	'merchandise'

A process related to k–sibilantization takes place in the language of Toraja Saqdan, in which root final /q/ becomes [r] or [s] before the derivational suffix –an. Sometimes the same base can have both 'r' and 's' derivations with no difference in meaning. Although I am presenting a synchronic analysis in which we see /k/ —> [s], historically it seems that the process has gone the other direction. Concerning Toraja Sa'dan, Mills (1975:97) writes:

> Even though the majority of bases have derivations with only one or the other consonant, the presence of final /r/ or /s/ in underlying forms is still . . . debatable. . . . it is fairly clear that Sa'dan speakers view the process as (synchronically)
>
> q —> r,s / ____ + an
>
> rather than
>
> r,s, —> q / ____ #

---

[8]An alternate hypothesis would be that the underlying form of the derivational morpheme is *–sam. If this were the case, the /s/ would be lost in all positions except after /k/. When the stem final consonant is /k/, then /k/ would be deleted and /s/ would remain. The reason for the loss of one of the consonants (either the stem final consonant or the /s/) would, perhaps, be to avoid unallowable consonant clusters. However, this argument is weakened when we consider vowel final stems such as ande 'to eat'. When derivational –am is attached, there is no /s/ present: ande+am —> [andéam] 'something edible', not *[andésam]. There are no conditioning factors which require the deletion of /s/ before a vowel final stem.

> Only such a change in the rules will account for the presence of /r/ or /s/ in the doublets, and for the fact that these inserted consonants for the most part have little relationship with the reconstructible PSS [Proto South Sulawesi] or PAN [Proto Austronesian] final, and thus must be the result of analogy.[9]

PUS has taken the analogy one step further and regularized the process so that all (historically) non–nasal final consonants are now realized as [ʔ] word final and [s] before the derivational suffix –am.

It is significant to note here (cf. 4.1) that in addition to /k/ changing to [s] the consonant also changes from being the coda of the word final syllable (before the addition of –am) to taking the onset position of the –am syllable. Thus /ba.luk.am/ becomes [ba.lú.sam]. K–sibilantization applies before k–weakening in a bleeding order relationship. The following derivation demonstrates both of the preceeding 'k– rules':

(22)	Underlying form	/la-ku-pak-tappak-am-ko/
	k-sibilantization	la-ku-pak-tappas-am-ko
	k-weakening	la-ku-paʔ-tappas-am-ko
	stress	la-ku-paʔ-tappás-am-ko
	new syllabification	la-ku-paʔ-tappá.s-am-ko
	other	la-ku-paʔ-tappá.s-aŋ-ko
	Surface form:	[lakupaʔtappásaŋko]
		'I'll wash-clothes for you.'

As earlier noted, several major processes of PUS also involve the phonemes /m/ and /ŋ/. The general rules for morpheme final /m/ and /ŋ/ follow.

First, I will look at what occurs when a nasal is followed by a non–syllabic phoneme.

When a nasal is followed by a stop (p,t,k,b,d,g) or another nasal (m, n, ŋ), the nasal assimilates to the same point of articulation as the following stop.

(23) Nasal assimilation:

$$[+\text{nasal}] \longrightarrow \begin{bmatrix} \alpha\ \text{anterior} \\ \beta\ \text{coronal} \end{bmatrix} / \_\_\_ \begin{bmatrix} -\text{syllabic} \\ \alpha\ \text{anterior} \\ \beta\ \text{coronal} \end{bmatrix}$$

This rule applies intermorphemically and inter–word within phonological levels P1 and P2 (see 3.2.2).

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[9]Mills posits the set of final consonants in Proto South Sulawesi as (p?), t, k, m, n, ng, r, h, l, and s (1975:334–5). The fact that Toraja Sa'dan only produces 'r' and 's' before derivational –an, and PUS only produces 's' before derivational –am, leads to Mills' conclusion that a neutralization of consonants before the derivational suffixes is a result of analogy.

(24)	a. /um-tibe-æk/	-->	[untíbeæʔ]	'I throw away'
	b. /daham-ku/	-->	[dahán̪ku]	'my horse'
	c. /tedom-na/	-->	[tedónna]	'his buffalo'
	d. /maŋ-bata/	-->	[mambáta]	'to read'
	e. /pissam di-ande/	-->	[píssan diánde]	'eaten at once'
	f. /asam kale-ku/	-->	[ásaŋ kaléku]	'my whole body'

There are two further processes closely related to nasal assimilation. Continuantization produces a continuant geminate, and consonant deletion retains the nasal and deletes the following consonant. Both of these processes are ordered after nasal assimilation. First we look at what generally occurs when a nasal is followed by a continuant, i.e., /l,b̶,s,h/. When this occurs, the nasal undergoes total assimilation in all features thus resulting in a geminate so that /N–l, N–b̶, N–s, N–h/ —> [ll, b̶b̶, ss, hh].

(25) Continuantization:

$$[+\text{nasal}] \dashrightarrow \begin{bmatrix} +\text{continuant} \\ \alpha\ \text{voice} \end{bmatrix} \; / \; \_\_\_\_ \; \begin{bmatrix} -\text{syllabic} \\ +\text{continuant} \\ \alpha\ \text{voice} \end{bmatrix}$$

This rule also applies intermorphemically and inter-word within phonological levels P1 and P2 (see 3.2.2). The following examples show the underlying form and the surface form after nasal assimilation and continuantization occur.

(26)	a. /um-sakka/	->	[ussákka]	'catch (fish)'
	b. /um-hab̶ik/	->	[uhháb̶iʔ]	'hit w/ device'
	c. /meŋ-lao/	->	[mellá̱o]	'to travel'
	d. /læŋæm hante/	->	[lǽŋæ̱h hánte]	'go up to Hante'
	e. /itim lima-mu-o/	->	[ítil̲ l̲imámmuo]	'your hands'

The two processes nasal assimilation and continuantization similarly function in English with the prefix in–. Note the assimilation of the nasal in the words 'intolerable' and 'impossible' and the process of continuantization in the words 'illogical' and 'irresponsible' (however in these cases [ll] and [rr] reduce to [l] and [r]).

If possible, it would be better to combine nasal assimilation and continuantization into one rule. As will be shown in consonant deletion, however, they are really two separate but related processes.

Before going on to consonant deletion we will look at a process involving the prefix saŋ– 'a, one'. When saŋ– is followed by a vowel initial morpheme the /ŋ/ geminates according to ŋ–gemination, e.g., /saŋ–ampak/ —> [saŋŋámpaʔ] 'a mat'. When, however, the prefix saŋ– is followed by a non–syllabic word initial phoneme, the final /ŋ/ of the prefix is deleted in a process unique to this prefix.

(27) Nasal deletion:

ŋ --> ϕ / - s a ____ - [-syllabic]

/saŋ-buli/	-->	[sabúli]	'a stalk' (bananas)
/saŋ-kæju/	-->	[sækǽju]	'a stick' (corn, fish)
/saŋ-lampu/	-->	[salámpu]	'a section of bamboo'

Nasal deletion occurs before continuantization in a bleeding order relationship. If the order were reversed then saŋ- plus a continuant-initial word would result in the final /ŋ/ becoming a continuant such as /saŋ-sóppe/ —> *[sassóppe] when it is actually [sasóppe] 'a bunch (of bananas)'. One notable exception to this rule is /saŋ-hupa/ which is a commonly used word meaning 'a kind of'. In this case the surface form is [sahhúpa] which means that /hupa/ is marked [-nasal deletion] in the lexicon which leaves the nasal intact to be affected by continuantization resulting in geminate [hh].

In a few rare cases involving /ŋ/-final prefixes followed by word initial /p/, /b/, /t/, or /s/, the word initial consonant is deleted, leaving only the nasal. The fact that the nasal is at the point of articulation of the deleted stop bears out that nasal assimilation must be ordered before consonant deletion, which is ordered before continuantization. Note also that nasal deletion occurs before consonant deletion in a bleeding order relationship.

(28) Consonant deletion:

$$\begin{bmatrix} +\text{consonant} \\ +\text{anterior} \\ -\text{nasal} \end{bmatrix} \text{---> } \phi \text{ / } [+\text{nasal}] \text{ - } \begin{bmatrix} \\ \\ \text{prefix} \end{bmatrix} \text{ ____}$$

It must be noted that in order to form a natural class for this rule I have used [+anterior] which also includes /d/ and /l/ (as well as /ɓ/, but it rarely appears word initial). To date, no cases of this process have actually been found involving /d/ and /l/. At this writing I do not know whether the fact that both /d/ and /l/ are voiced alveolars eliminates them from the consonant deletion rule or whether it is just a matter of infrequency of occurrences of the application of this rule. In any case, because of the randomness of the occurrences, the roots involved will have to be marked in the lexicon as [+consonant deletion]. Following are examples from the roots /sobe/ 'to burn', /suhak/ 'write', /tottæk/ 'pierce', and /bisæk/ 'split wood with axe'.

(29)

U. form	/maŋ-sobe/	/maŋ-suhak/	/maŋ-tottæk/	/maŋ-bisæk/
Nas Asim	maŋ-sobe	maŋ-suhak	maŋ-tottæk	mam-bisæk
Cons. del	man-_obe	-----	man-_ottæk	mam-_isæk
Con'z'tion	-----	mas-suhak	-------	------
k-weak	-----	mas-suha?	man- ottæ?	mam- isæ?
Stress	man- óbe	mas-súha?	man- óttæ?	mam- ísæ?
Surface	[manóbe]	[massúha?]	[manóttæ?]	[mamísæ?]

So we see that while /suhak/ is unaffected by consonant deletion, /sobe/ /tottæk/ and /bisæk/ must be labeled [+consonant deletion].

Next we will examine the processes which take place when a vowel follows /ŋ/ intermorphemically. When the prefixes maŋ–, meŋ–, peŋ–, paŋ–, and saŋ– occur before a vowel–initial word, /ŋ/ becomes geminate [ŋŋ]

(30) ŋ-gemination:

$$- \quad C \quad V \quad \begin{bmatrix} +\text{nasal} \\ -\text{anterior} \\ -\text{coronal} \end{bmatrix} \quad - \quad V \quad \rightarrow \quad 1 \quad 2 \quad 3 \quad 3 \quad 4$$

$$\qquad 1 \quad 2 \qquad\qquad 3 \qquad\qquad 4$$

(31)

a. /maŋ-allo/	[meŋŋállo]	'to sun'
b. /meŋ-olokolok/	[meŋŋolo?ólo?]	'animal-like'
c. /di-po-pak-paŋ-ohhok/	[dipopa?peŋŋóhho?]	'to land-fill'
d. /peŋ-andak-am/	[peŋŋandásam]	'handle'
e. /saŋ-ampim/	[seŋŋámpim]	'a section (of a mat)'

When the transitive prefix um– occurs before a vowel–initial word, /u/ metathesizes with /m/ resulting in the prefix [mu] (not to be confused with second person pronominal prefix mu–). For examples of um– before a consonant–initial word, refer to nasal assimilation and continuantization.

(32) um-mu metathesis:

$$\begin{matrix} - & u & m & - \\ & 1 & 2 & \end{matrix} \quad \Big] \quad \begin{matrix} V & \rightarrow & 2 & 1 & 3 \\ 3 & & & & \end{matrix}$$

prefix

(33)	a.	/um-alli-æk/	[muálliæ?]	'I buy (bananas)'
	b.	/um-ita-ko/	[muítako]	'you see (the bird)'
	c.	/um-ælæ-i-kik/	[muɛ́læiki?]	'we remove (it)'

As stated earlier, both the benefactive suffix on verbs and the nominalizing suffix have the form –am. When stem final /m/ is followed by –am, /m/ becomes /ŋ/.

(34) Nasal velarization:

$$[+\text{nasal}] \rightarrow \begin{bmatrix} -\text{anterior} \\ -\text{coronal} \end{bmatrix} / \_\_\_\_ - V\ [+\text{nasal}] -$$

Note how /m/ —> [ŋ] when the suffix –am is added to the roots /hapam/ 'example', /eham/ 'ladder' and /tanam/ 'to plant'.

(35)	a.	/pe-hapam-am/	--> [pehapaŋam]	'moral story'
	b.	/po-eham-am/	--> [poehaŋam]	'ladder materials'
	c.	/ku-tanam-am/	--> [kutanaŋam]	'I plant for (him)'

Nasal velarization is iterative as shown below:

(36)	Underlying form	/baŋom-am-am-æk/
	k-weakening	baŋom-am-am-æ?
	nasal velarization	baŋoŋ-am-am-æ?
	nasal velarization	baŋoŋ-aŋ-am-æ?
	stress	baŋoŋ-áŋ-am-æ?
	other...	
	Surface form	[baŋoŋáŋænnæ?]
		'Raise (him) for me.'

When word final /æ/ is followed by the derivational suffix –am, the phone [ŋ] is inserted. This process is undoubtedly related to the /æ/–aŋ relationship I will briefly discuss in section 8.[10]

(37) ŋ-insertion:

$$\phi \rightarrow ŋ \ /\ æ \_\_\_\_ - am -$$

Underlying form	/peŋ-kæhæ-am/	/pe-læntæ-am/
ŋ-insertion	peŋ-kæhæŋ-am	pe-læntæŋ-am
stress	peŋ-kæháŋ-am	pe-læntáŋ-am
Surface form	[peŋkæháŋam]	[pelæntáŋam]
	'task'	'garden house location'

[10]See the appendix for a presentation of neighboring language correspondences to the PUS [æ].

I showed above in nasal velarization that [m] becomes [ŋ] when followed by a suffix -am. In other cases of word final /m/ followed by a vowel, whether across morpheme, clitic or word boundary, /m/ becomes [nn]. The rule m:n-gemination will demonstrate this occurrence.

(38) m:n-gemination:

$$\begin{array}{cccccccc} m & \{-\atop \#\} & V & \longrightarrow & n & n & 2 & 3 \\ 1 & 2 & 3 & & & & & \end{array}$$

m:n-gemination states that whenever /m/ is followed by an affix, clitic, or word boundary which is in turn followed by a vowel; the /m/ geminates becoming [nn] as is illustrated in the following examples:

(39)	a. /ku-issam-i/	-->	[kuíssanni]	'I know it'
	b. /daham-o/	-->	[dáhanno]	'(that) horse'
	c. /maŋ-anam-æk/	-->	[məŋŋánannæ?]	'I am weaving.'
	d. /asam#aka/	-->	[ásan náka]	'all of them?'
	e. /di-kuhæm-i/	-->	[dikuhánni]	'to decrease'

Contrary to expectation, m:n-gemination does not take place in the case of the perfective clitics followed by the first person clitic -æk.

The perfective clitic occurs in three forms. I will present these forms and the environments in which they occur without attempting to identify one particular underlying form.

(40)

a. When following a vowel, the form is -m:

lakbi-m	--> [lá?bim]	'already more'
pitu-m	--> [pítum]	'already seven'

b. When following a /k/, the form is -um:

mammak-um	--> [mámma?um]	'already asleep'
lekbak-um	--> [lé?ba?um]	'already left'

c. When following a /m/, the form is -mi:

uham-mi	--> [úhammi]	'already raining'
asam-mi	--> [ásammi]	'already all of them'

The following example demonstrates how perfective clitic –m does not become [nn] when followed by –æk.

(41)	Underlying form	/maŋ-ande-m-æk/	
	ŋ-gemination	maŋŋ-ande-m-æk	
	k-weakening	maŋŋ-ande-m-æ?	
	m:n-gemination	----------	Not *maŋŋ-ande-nn-æ?
	stress	maŋŋ-ánde-m-æ?	
	other...		
	Surface form	[məŋŋándemæ?]	Not *[məŋŋándennæ?]
		'I've eaten.'	

The derivation above shows how, contrary to expectation, the perfective clitic –m does not undergo m:n–gemination. The same is true when the perfective clitic form –um precedes the first person clitic –æk.

Possessiveness in PUS is shown by the addition of the appropriate possessive pronoun suffix to the possessed nominal word. While this is more fully discussed elsewhere (see Campbell 1989), there is a particular phonological pattern which warrants mention in this study. When the nominal word ends in the vowels /i/, /u/, and in many cases, /a/, then a nasal excrescent 'N' is inserted before the possessive suffix. However, when a nominal word ends in /e/, /æ/, or /o/ there is no insertion of N. In his studies of Toraja Saqdan, (a language closely related to PUS), Van der Veen (1924) found that nasals are inserted after possessed nouns which end in /i/ or /u/ and after some nouns which end in /a/. More recently, Sirk (1988) has studied the presence of such nasal segments in several South Sulawesi languages. Sirk presents an historical explanation showing that the nouns which take a nasal insertion before a possessive suffix are those nouns which are derived from proto–forms ending in vowels. Those nouns which cannot take nasal insertion are those which derived from proto–forms which ended with consonants.

While acknowledging the historical developments of South Sulawesi languages, I here present rules which capture synchronic characteristics of the phonology of PUS. In order to capture this nasal insertion process it would be preferable to use one rule (which would be the more economical presentation). However, as only about 30% of the /a/–final nominal words are affected, it would be less accurate to include /a/ in the same rule as /i/ and /u/ even if we in turn marked the excluded cases in the lexicon. So, instead I will present two almost identical rules which describe how words are affected by N–insertion.

(42) N-insertion:i,u

$$\phi \text{ ---> [+nasal] } / \begin{bmatrix} V \\ +high \end{bmatrix} \quad \_\_\_ \quad - \quad [C]$$

possessive suffix

(43)	Underlying form	/punti-mu/	/asu-ku/
	nasal insertion	puntiN-mu	asuN-ku
	nasal assimilation	puntim-mu	asuŋ-ku
	stress	puntím-mu	asúŋ-ku
	Surface form	[puntímmu]	[asúŋku]
		'your banana'	'my dog'

Note that the nasal insertion rules must come before nasal assimilation.

(44) N-insertion:a

$$\phi \text{ ---> [+nasal] / a } \_\_\_ \text{ - } \boxed{\text{C}}$$

possessive suffix

This rule is limited in applicability. Check the lexicon for affected words. Below are the derivations of two /a/–final nominal words. Note that /banua/ is affected and would need to be so marked in the lexicon.

(45)	Underlying form	/banua-na/	/sola-na/
	nasal insertion	banuaN-na	----
	nasal assimilation	banuan-na	----
	stress	banuán-na	solá-na
	Surface form	[banuánna]	[solána]
		'his house'	'his friend'

In certain closed syllables the phoneme /e/ undergoes a change which laxes it to the allophone [ɛ].

(46) e-laxing:

$$e \text{ ---> } \varepsilon \text{ / } \_\_\_ \left\{ \begin{bmatrix} C \\ +\text{anterior} \end{bmatrix} \right\} \left\{ \begin{matrix} \# \\ C \end{matrix} \right\}$$

$$\left\{ \begin{bmatrix} C \\ +\text{coronal} \end{bmatrix} \right\}$$

E–laxing laxes the phoneme /e/ in the environment of a closed syllable except when the following consonant is a back consonant, i.e., [k], [ŋ], [ʔ] and [h].

Underlying form	/tettek/	/meŋ-diok/	/meŋ-kæhæ/
nasal assimilation	---	men-diok	-----
k-weakening	tette?	men-dio?	-----
e-laxing	tɛtte?	mɛn-dio?	-----
stress	tétte?	mɛn-dío?	meŋ-kǽhæ
Surface form	[tétte?]	[mɛndío?]	[meŋkǽhæ]
	'hour'	'to bathe'	'to work'

Nasal assimilation must be ordered before e–laxing. Since the allophone [ɛ] appears in closed syllables which are closed by non–back consonants, any rule which would change the point of articulation of a consonant from back to non–back or vice versa must occur before e–laxing.

I mentioned earlier that one-syllable words are rare in PUS. When one-syllable words are spoken in isolation, generally the vowel nucleus is repeated after a weak glottal stop.

(47) vowel repetition:

$$\#\ C\ V\ C\ \#\ \text{--->}\ 1\ 2\ 3 \begin{bmatrix} -\text{cons} \\ -\text{cont} \\ -\text{anterior} \\ -\text{coronal} \\ -\text{voice} \\ +\text{weak} \end{bmatrix} 3\ 4\ 5$$

$$1\ 2\ 3\ 4\ 5$$

Vowel repetition applies to words spoken in isolation

Underlying form	/dem/	/tæk/
vowel repetition	deˆem	tæˆæk
k-weakening	----	tæˆæʔ
e-laxing	deˆɛm	----
stress placement	déˆɛm	tǽˆæʔ
surface form	[déˆɛm]	[tǽˆæʔ]
	'there is'	'no'

We see in the example above that vowel repetition must occur before e-laxing and the stress rules.

In another rule involving vowel weakening, unstressed /a/ raises to [ə] before a sequence of /ŋ/ followed by a non-syllabic phoneme.

(48) a-raising:

$$a \text{ ---> } ə \ /\ \underline{\quad\quad}\ ŋ\ [-\text{syllabic}]\ [-\text{stress}]$$

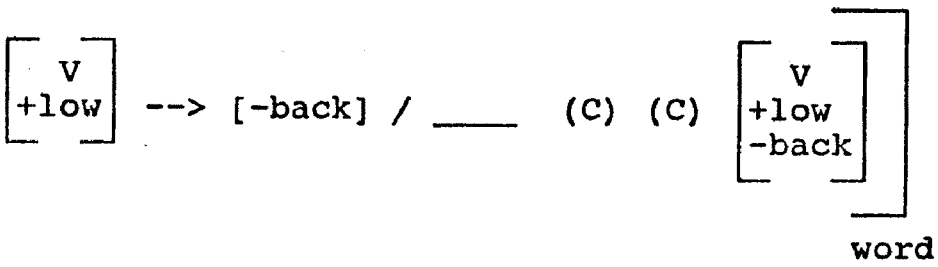
(49)

U. form	/maŋ-allo/	/maŋ-baja/	/maŋ-kekek/
nasal assim.	-------	mam-baja	maŋ-kekek
ŋ-gem.	maŋŋ-allo	----	------
stress	maŋŋ-állo	mam-bája	maŋ-kékek
a-raising	məŋŋ-állo	----	məŋ-kékek
k-weakening	------	----	məŋ-kéke?
Surface form	[məŋŋállo]	[mam-bája]	[məŋkéke?]
	'to sun'	'all'	'to bite'

Before a–raising can occur any rule involving the generation of [ŋŋ] must occur. Therefore, as shown above, nasal assimilation and ŋ–gemination precede a–raising. Also, stress placement must precede this rule since stressed /a/ is not affected.

We saw in 4.3 that phonemes /a/ and /æ/ never co–occur intramorphemically, and intermorphemically only co–occur between word and clitic. Even when there are intervening consonants within the word we never find [a] and [æ] within the same word unless there is also an intervening vowel. This is due to vowel harmony.

(50) vowel harmony/æ:



/ma-læppuk/	--> [mælǽppu?]	'tired'
/mak-kælluk-æk/	--> [mæ?kǽllu?æk]	'I'm shaving'
/na-ægæk-i/	--> [næægǽ?i]	'he's lying'

As the rule reads, vowel harmony only occurs right to left. Thus we find the following forms in PUS:

/ænæk-na/	--> [ænǽ?na]	'his child'
/bæbæ-kam/	--> [bǽbækam]	'just (gave it to) us'

I stated above that vowel harmony/æ only occurs within words. It does not occur across clitic or word boundaries. Note the absence of vowel harmony when the clitic /æk/ follows a word.

/mak-tekak-æk/	--> [ma?téka?æ?]	'I'm tree-climbing'
/mammak-æk/	--> [mámma?æ?]	'I'm sleeping'

Vowel harmony/æ occurs across clitic boundaries only when the benefactive suffix –am is followed by the first person clitic –æk as shown below.

/huntu-i-am-æk/	--> [huntuiánnæ?]	'pull for me'

Vowel harmony/æ presents an enigma. There are many roots in PUS which have more than one /æ/. In light of vowel harmony/æ do we then consider the underlying form of [læntæ] 'garden house', for example, as /lantæ/? Or is it /læntæ/ independent of vowel harmony/æ? The argument regarding positing underlying forms which never exist on the surface (see 4.2) must apply here. Although there are indications that vowel harmony may play a role within the root, there is no proof that the first /æ/ in, for example, /læntæ/ is actually /a/, since that alternant never exists phonetically. Therefore, I cannot justify positing such an underlying form.

The pronominal affix –æk is most often found as a clitic, but is also found to fill the slot of a suffix when marking the benefactee in a transitive verb clause. In such cases vowel harmony takes place along with another process, i.e., vowel deletion/æ. In PUS we only find the geminate /ææ/ intermorphemically, and only then if both vowels are unstressed. When the second /æ/ in the pair is stressed, as we find after vowel harmony (as found in benefactive verb constructions—first person as benefactee), the unstressed /æ/ is deleted.

(51) vowel deletion/æ:

$$\begin{bmatrix} V \\ +low \\ -back \end{bmatrix} \quad \text{--> } \phi \quad / \quad \underline{\quad\quad} \quad \begin{bmatrix} V \\ +low \\ -back \\ +stress \end{bmatrix}$$

Underlying Form	/ala-am-æk/	/ua-am-æk/
vowel harmony/æ	ælæ-æm-æk	uæ-æm-æk
m:n-gemination	ælæ-æn-næk	uæ-æn-næk
stress placement	ælæ-ǽn-næk	uæ-ǽn-næk
vowel deletion/æ	æl -ǽn-næk	u -ǽn-næk
k-weakening	æl -ǽn-næ?	u -ǽn-næ?
Surface form	[ælǽnnæ?]	[uǽnnæ?]
	'get (it) for me'	'tell me'

Note that in addition to coming after vowel harmony/æ, this deletion rule must be preceded by stress placement.

One way in which a question is formed in PUS is by the addition of the clitic –ka after the verb. Frequently in addition to –ka we find the uncertainty clitic –hi preceding –ka and helping to form the question. While the exact role of –hi is not yet clear it seems to carry the meaning of contra–expectation/surprise/uncertainty. Here I will discuss what happens phonologically when –hi and –ka are juxtaposed with certain pronominal clitics and/or the plural clitic –ak.

Table 6.—Question Clitics with Juxtaposed Pronouns

Following a vowel-final stem:

Underlying form		Surface form
-hi-ka	-->	haka
-hi-ka-æk	-->	hækæ?
-hi-ko-ka	-->	hokoka/hakoka
-hi-kik-ka	-->	hakika
-hi-ki-ka-ak	-->	hakika?
-hi-ko-ka-ak	-->	hokoka?/hakoka?

Following a consonant final stem:

Underlying form		Surface form
-di-ka	-->	daka
-di-ka-æk	-->	dækæ?
-di-ko-ka	-->	dokoka/dakoka
-di-kik-ka	-->	dakika
-di-ki-ka-ak	-->	dakika?
-di-ko-ka-ak	-->	dokoka?/dakoka?

(52) /la-sola-hi-ki-ka-ak adi-mu læŋæm hante dakok/

[lasólahikika? adímmu léŋæh hánte dáko?]

'Will your younger brother go with us (incl) up to Hante later?'

(53) /la-sola-hi-ko-ka-ak adi-mu læŋæm hante dakok/

[lasólahokoka? adímmu léŋæh hánte dáko?]

'Will your younger brother go with you up to Hante later?'

(54) /la-sola-hi-ka-kam adi-mu læŋæm hante dakok/

[lasólahakakan nadímmu léŋæh hánte dáko?]

'Will your younger brother go with us (excl) up to Hante later?'

Example (52) above is given as an example of no phonological alteration for hi-ki-ka. In forming the question with the second person pronominal clitic -ko (example (53)) we see vowel harmony which results in hi-ko-ka —> [hokoka]. Observe also the vowel harmony in example (54) where hi-ka —> [haka].

Similarly, vowel harmony occurs when perfective –mi or imperfective –pi are juxtaposed with pronominal clitics and/or the question clitic –ka. Tables 7 and 8 demonstrate the surface realizations of juxtaposed pronominal clitics and the aspect clitics –mi and –pi. Examples (55), (56), and (57) illustrate vowel harmony in questions which are modified by one of the aspect clitics.

Table 7.—Perfective –mi with the Absolutive Pronouns

Following Vowel Final Stems: -m

sule-m-æk	--> -mæ?	'I've come.'
-ko	-ŋko	'You've come.'
-koak	-ŋkoa?	'Have you all come?'
si-tammu-m-kik	-ŋki?	'We(du in) have met.'
-kiak	-ŋkia?	'We all (in) have met.'
sule-m-kam	-ŋkam	'We(ex) have come.'

Following Nasal Final Stems: -mi

bulim-mi-æk	--> -mæ?	'I'm lost.'
mak-tedom-mi-ko	-moko	'You have buffalo.'
kasalle asam-mi-koak	-mokoa?	'You all are big.'
bulim-mi-kik	-miki?/-maki?	'We're(2in) lost.'
bulim-mi-kiak	-mikia?	'We're(in) all lost.'
mak-sambajam-mi-kam	-makam	'We(ex) prayed.'

Following Glottal Final Stems: -um

tahhuk-um-æk lao	-->	tahhu?-mæ? lao	'I'm going on'
tæk-um-ko la landak	-->	tæk-uŋko la landa?	'You won't' land'
tæk-um-koak mala	-->	tæk-uŋkoa? mala	'You(pl) can't'
tæk-um-kik	-->	tæk-uŋki?	'We(du in) won't'
saidik-um-kiak	-->	saidi?-uŋkia?	'We(in) almost'
meŋ-tuelik-um-kam	-->	mentueli?-uŋkam	'We moved'

Table 8.—Forms of Imperfective -pi

sule-pi-æk -->	pæ?	'later when I come'
-ko	poko	'later when you come'
-koak	pokoa?	'later when you all come'
-kik	piki?/paki?	'later when we(2 in) come'
-kiak	pikia?	'later when we all come'
-kam	pakam	'later when we(ex) come'

(55) /mala-pi-ko-ka sule makalek/

[málapokoka súle makále?]

'Can you come again tomorrow?'

(56) /dem-mi-ka/

[dɛ́mmaka]

'Are there already?'

(57) /dem-mi-ko-ka læŋæm makkasak/

[dɛ́mmokoka lǽŋæm mákkasa?]

'Have you been to Makassar?'

(58) vowel harmony/clitic:

$$- \begin{bmatrix} -\text{syll} \\ \text{V} \end{bmatrix}_3 - \text{k} \quad \begin{bmatrix} \text{V} \\ \alpha\ \text{back} \\ \beta\ \text{high} \\ \Gamma\ \text{low} \end{bmatrix}_6 \quad \text{--> 1 2} \quad \begin{bmatrix} \alpha\ \text{back} \\ \beta\ \text{high} \\ \Gamma\ \text{low} \end{bmatrix}_3 \quad 4\ 5\ 6$$

1 2 3 4 5

clitic

This rule states that when the clitics –hi, –pi, or –mi precede either the pronominal clitics or the question clitic –ka, the vowels in the former clitics will harmonize with the first vowel of the following clitic.[11]

Let me now return to example (53) above. In addition to vowel harmony note that hi–ko–ka–ak becomes [hokoka?] with the deletion of an [a]. Example (52) shows this same deletion. There is a similar occurrence with the first person clitic –æk.

(59) /na-ita-i-hi-ka-æk/

[naitáihækæ?]

'Did they see me?'

---

[11]An exception to this involves the pronominal clitic –kik as illustrated in the example /bulim–mi–kik/ 'we're (2in) lost' in which we would expect the vowel of the perfective clitic –mi to harmonize with the following i forming [miki?]. That indeed is one of the possible surface forms, but the surface form can also optionally be [maki?]. Similarly, –pi–kik can have the surface form [piki?] or [paki?].

In example (59) hi–ka–æk is pronounced [hækæʔ]. Two processes are at work here. First, the vowel [a] preceding /æk/ is deleted. According to vowel deletion/clitic (see (61)) when a clitic followed by a morpheme results in two juxtaposed vowels, then the first of this pair is deleted. Secondly, after vowel deletion is complete, vowel harmonization take place.

Another example of vowel deletion involves perfective –um which we looked at earlier. Note what happens when –um is in turn followed by a vowel–initial clitic:

(60) /lekbak-um-æk/

[lé?ba?mæ?] (not *[lé?ba?umæ?])

'I went'

Note that in this case the deleted vowel is not juxtaposed with another vowel, but rather a vowel initial clitic follows a consonant final clitic. The vowel of the first clitic is deleted when the second clitic is vowel initial.

Underlying form	/na-lambik-um-æk/
k-weakening	na-lambiʔ-um-æʔ
v-del/clitic	na-lambiʔ-_m-æʔ
stress	na-lámbiʔ-m -æʔ
Surface form	[nalámbiʔmæʔ]
	'(it) already got me'

One other example of vowel deletion involves the clitic –hi when followed by the free pronoun ia '3p'. When this occurs –hi attaches to the following pronoun and vowel deletion/clitic takes place as shown below.

/ku-saŋa posa anna asu hi ia/

[kusáŋa pósa ánna ásu hía]

'I thought it was a cat, but it's a dog.'

Vowel deletion/clitic states that the vowel of a clitic which is followed by a vowel initial clitic will delete.

(61) vowel deletion/clitic:

$$V \rightarrow \phi \; / \; (C) \_\_\_\_ \; \underset{\text{clitic}}{\left[(C) \right]} \; - \; V$$

Underlying form	hi-ka-æk
v-del/clitic	hi-k_-æk
vowel harmony/clitic	hæ-k -æk
k-weakening	hæ-k -æʔ
Surface form	[hækæʔ]

When syllable final /a/ of an antepenultimate syllable is followed by a vowel initial penultimate syllable, /a/ coalesces with that following vowel forming a diphthong. The diphthong then takes the stress.

(62) diphthongisation:

$$a \; V \rightarrow \acute{a}^{V} \; / \; \_\_\_\_ \; (C) \; (C) \; V \; (C) \#$$

(63)	a. /baine/	-->	[bá^{i}ne]	'woman'
	b. /tau-mu/	-->	[tá^{u}mmu]	'your guests'
	c. /pao-ku/	-->	[pá^{o}ku]	'my mango'

In the process h-replacement/d the phoneme /h/ in the clitic –hi is replaced by [d] when preceded by a consonant.

(64) h-replacement/d:

$$h \rightarrow d \; / \; C \; \begin{Bmatrix} \# \\ - \end{Bmatrix} \; \_\_\_\_ V \; \underbrace{\rceil \; -}_{\text{clitic}}$$

(65) /ta-tuŋkak-i-hi-ka bakba-na/

[tatúŋka?ihaka ba?bána]

'Shall we open his door?'

(66) /ti-tuŋkak-hi-ka bakba-na/

[titúŋka?daka ba?bána]

'Is his door open?'

(67) /tæk ku-issam battu la-mæsæe-hi battu la-tæk-hi/

[tǽ? kuissam báttu lamæsǽehi báttu latǽ?di]

'I don't know if it'll be a long time or not.'

(68) /la-mak-tappak-hi-ko-ka la-mak-base-hi-ko-ka/

h-rep/d	la-mak-tappak-di-ko-ka la-mak-base-hi-ko-ka
v har/clit	la-mak-tappak-do-ko-ka la-mak-base-ho-ko-ka
k-weak	la-ma?-tappa?-do-ko-ka la-ma?-base-ho-ko-ka
stress	la-ma?-táppa?-do-ko-ka la-ma?-báse-ho-ko-ka

Surface [lama?táppa?dokoka lama?básehokoka]

'Are you going to wash clothes or do dishes?'

(69) /ku-saŋa tedom anna daham hi ia/

h-replace/d	ku-saŋa tedom anna daham di ia
v-del/clitic	ku-saŋa tedom anna daham d_ ia
nasal assim.	ku-saŋa tedom anna dahan d ia
m:n gemin.	ku-saŋa tedon nanna dahan d ia
stress	ku-sáŋa tédon nánna dáhan d ía

Surface form [kusáŋa tédon nánna dáhan día]

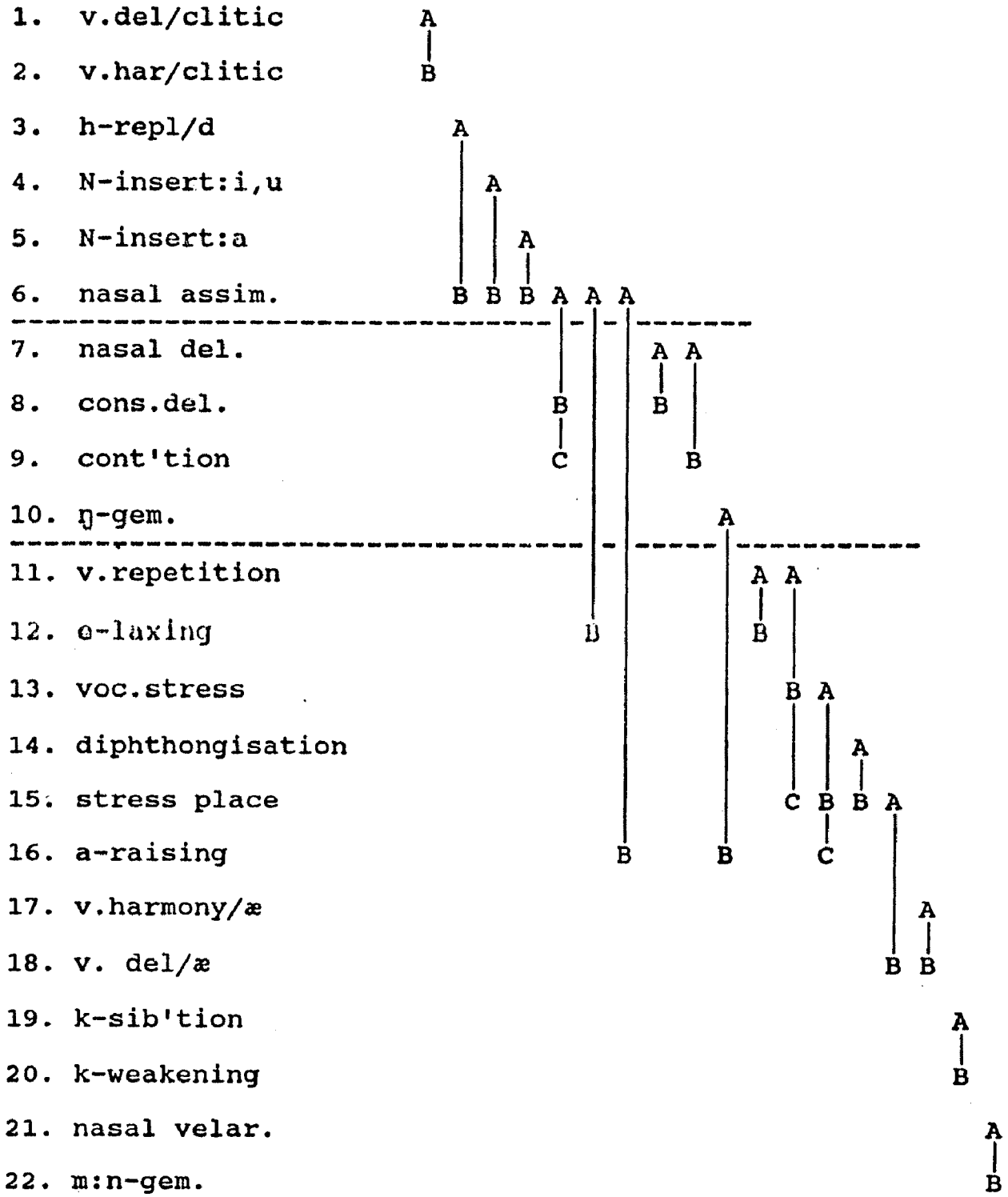
'I thought it was a water buffalo but it's a horse'

In example (65) above -hi follows a vowel and retains the phone [h]. In example (66) a consonant precedes -hi and because of h-replacement/d and vowel harmony/clitic, the resultant surface form is [da]. In example (67) -hi becomes [di] when following a consonant but remains [hi] after a vowel. This -hi —> [di] occurrence seems odd at first glance as it is difficult to perceive any phonological motivation. Note, however, that the PUS phoneme /h/ corresponds to /r/ in the neighboring Mamasa language. In Mamasa /r/ —> [d] in the same environment as /h/ —> [d] in PUS. The Mamasa phonological process, in which /r/ —> [d] when following consonants, is phonologically motivated and helps account for the corresponding process in PUS.

In example (69) h-replacement/d must precede nasal assimilation.

Table 9 presents the rules we have covered in this paper. While not all rules in PUS are ordered there are, as we have seen, several sets of rules which must be ordered. Only the rules shown connected A-B(-C) are actually ordered with respect to each other. The remaining rules are placed arbitrarily on the chart.

Table 9.—Ordered Rules



6. FREE VARIATION

As with speakers of all languages, PUS speakers do not always adhere to the phonological rules used to describe the language. We find variation between speakers as well as variation in the speech of individuals. In the following cases of speech variation I have not been able to identify groups by gender, age, social status or any other category which would explain patterns of variation. Perhaps more time in the location of research will enable me to begin identifying speech groups, if there are indeed specific groups. I will now outline some of the common variations.

A common alternation in Austronesian languages is between the phones [u] and [o]. PUS is no exception to this. Thus we find variations as follow.

(70) /pohe͟ba/ --> [pohé͟ba]

'clothes' [puhé͟ba]

(71) /muheam/ --> [muhéam]

'common cold' [mohéam]

In the case of [u]/[o] variation I find that the same speaker will always pronounce the word the same way. So this is an alternation between speakers.

The causative prefix /pa/ is pronounced by some speakers as [po]. This alternation is also speaker specific.

(72) /di-pa-bahinnik/ --> [dipabahínni?]

'to make smaller' [dipobahínni?]

(73) /di-pa-ma-hempo/ --> [dipamahémpo]

'to shorten' [dipomahémpo]

Earlier I presented the prefix um–. Most speakers use the form [uN] before consonant–initial transitive words (in the case of continuant–initial words the /m/ is replaced by the following continuant, resulting in a continuant geminate—see continuantization and example (74)). The form [mu] is optionally used for um– and is considered an acceptable speech form.

(74) /menna um-si-pak-tulak-am/ --> [ménna ussipa?tulásam]

'With whom did you speak?' [ménna musipa?tulásam]

I showed in ŋ–insertion that when word final /æ/ is followed by –am, then the phone [ŋ] is inserted. Also acceptable, but less common, is the formation of /æ/–final –am forms without the insertion of /ŋ/.

(75) /pe-læntæ-am/ --> [pelæntǽŋam]

'garden house location' [pelæntǽam]

(76) /ka-lempæ-am/ --> [kalɛmpǽŋam]

'path to house' [kalɛmpǽam]

The same speaker may use both forms, but the /ŋ/ form is generally spoken.

According to k–sibilantization the phoneme /k/ is replaced by [s] when immediately followed by the suffix –am. While the use of /s/ in this environment is considered by local speakers as the standard form, it is not uncommon to hear /k/ instead. When questioned, local speakers will invariably say that both forms are fine. Some will add, however, that the /k/ form is an influence from 'outside'. I have yet to identify the source of this form as I receive varying opinions.

(77) /peŋ-diok-am/ ---> [pendiósam]

'bathing area' [pendiókam]

(78) /pak-petuak-am/ ---> [pa?petuásam]

'view' [pa?petuákam]

When the clitic –hi undergoes vowel harmony/clitic the surface vowel harmonizes to the vowel of the following pronominal clitic. Alternately, and just as acceptable (though less common), is for the surface form to be [ha]; probably due to harmonizing with the [a] in the question clitic [ka].

(79) /si-biasa-hi-ko-ka ma-saki susi/ 'Is he usually sick like this?'

[sibiásahokoka masáki súsi]

or [sibiásahakoka masáki súsi]

In particular words there optionally occur nasalized vowels. This nasalization is not present in every occurrence of these words, even when spoken by the same person. Perhaps the phonemes /m/ and /h/ affect the nasality of following vowels.

(80) [mahi̯hi̯i̯] / [mahihi] 'yellow'
[sumə̨hhǫ] / [sumahho] 'cry'

When the prefix di– (passive) is preceded by la– (irrealis), frequently the d is dropped so that /la–di/ —> [lai]; e.g. /la–di–tanam/ 'will be planted' becomes [laitánam].

7. FEATURES OF FAST SPEECH

In previous sections I have referred to several features of fast speech. The most common features appear at morpheme and word boundaries where vowels juxtapose or word final [ʔ] is followed by a vowel.

Final vowels on prefixes followed by vowel–initial words are occasionally deleted in fast speech.

(81)

a.	/di-pa-okkok/	-->	[dipókkoʔ]	'to seat'
b.	/ku-ola/	-->	[kóla]	'I travel over'
c.	/mu-ua/	-->	[múa]	'you say'
d.	/di-pa-ande/	-->	[dipánde]	'to be fed'

In each of the cases above the juxtaposed vowels are back vowels which are either the same vowel or differ only by one degree of vowel height. In each case the stressed vowel is retained. Example (81d) is unique in that it has become the regular speech form to the point that, to the PUS speaker, the form *[paánde] is not recognizable as the same word. (This may have developed to differentiate from the similar word /pak–ande/—> [paʔánde] 'to eat a lot'.) I cannot make a general statement about deletion of juxtaposed /a/, as even in fast speech there are forms such as /ta–ande/ —> [ta ánde], 'let's eat'.

In fast speech word final /k/ ([ʔ]) is weakened and sometimes eliminated before vowel–initial suffixes or clitics.

(82)

/um-tuŋkak-i-kam/	--> [untuŋkáikam]	'we open (the door)'
/um-tutuk-i-æk/	--> [untutúiæʔ]	'I close (the book)'

I showed in vowel harmony/æ that within words the phoneme /a/ will harmonize to [æ] when /æ/ is the nucleus of the adjoining syllable to the right. In fast speech I find that harmonization occurs across clitic and even (rarely) word boundaries.

(83)

a.	/mesa-æk/	--> [mésæˆæʔ]	'by myself'
b.	/sia-m-æk/	--> [síæmæʔ]	'I already...truly'
c.	/lekbak-æk/	--> [léʔbæˆæʔ]	'I go'
d.	/mu-ampa-i-am#ænæk-na/	--> [muampáiæn nænéʔna]	'she looks after her child for her'

Of particular interest is example (83c) where we see not only vowel harmony but weakening of the glottal stop at the end of the word, before the clitic.

8. ADAPTATION OF LOAN WORDS

I will now present a brief overview of what occurs when words are borrowed into PUS and adapted to the phonology of PUS. The following presentation is not meant to be the final word on the subject but rather a quick peek at some of the things which occur when PUS speakers borrow words from Indonesian.

The first thing one notices concerning loan words is that there are various stages of adaptation. Some are fully altered to fit the acceptor phonology while others are not yet completely changed and still retain aspects of the source language. Often I find differences in pronunciation of the loan words among speakers of the acceptor language depending on the degree of exposure to the source language.

The above points are true concerning loan words in PUS. In this section on loan words I will present several rules for word adaptation. These 'rules' are to be taken as 'rules of thumb' to help summarize the statements here but not as hard and fast rules. A further, more in depth, study may enable firm up or alter these findings.

The following is a sampling of loan words from Indonesian. All PUS examples are written phonetically, while Indonesian examples are written orthographically (note, Indonesian c —> [tš]; ng —> [ŋ]).

Table 10.—Loan Words

	INDONESIAN	PUS	
1.	layang-layang	lajal-lájam	'kite'
2.	(ber)sembahyang	(ma?)sambájam	'pray'
3.	celana	talána	'pants'
4.	(mem)baca	(mam)báta	'read'
5.	sepatu	sapátu	'shoes'
6.	selimut	salímu?	'blanket'
7.	obeng	óbɛm	'screwdriver'
8.	cakalan	takálam	'tuna'
9.	piring	píhim	'plate'
10.	barang	báham	'goods'
11.	roti	hóti	'bread'
12.	langsat	lǽssæ	'type of fruit'
13.	benang	bǽnnæ	'thread'
14.	cangkir	taŋkíhi?	'cup'
15.	asal	asála?	'provided that'
16.	tanggal	taŋgála?	'date'
17.	kikir	kíkki?	'file'
18.	perkakas	pəŋkákka?	'tools'
19.	sekerup	sikúhu?	'screw'
20.	gergaji	gahagáji	'saw'
21.	kursi	kahósi	'chair'
22.	tuan dokter	tondótto?	'physician'
23.	bensin	béssim	'gasoline'

Examples 1 and 2 demonstrate what occurs when words with medial 'y' are borrowed into PUS i.e., y—>j. This also occurs in place names such as Salu Mayang —> [salumǽjæ] (name of village).

(84) loan rule y/j:

y --> j / V ___ V

From examples 3, 4, 8, and 14 we see that since there is no phoneme */c/ in PUS, all 'c' sounds in loan words change to the alveolar stop /t/.

(85) loan rule c/t:

c ---> t

In examples 3, 5, 6, and 20 the Indonesian sound 'e' ([ə]) becomes [a] in PUS. While the e —> [a] change often occurs, there are also examples such as 19 in which 'e' becomes 'i'.

I have shown that the only word-final nasal in PUS is /m/. Examples 1, 2, 7, 8, 9, 10, and 23 show that any other word-final nasal becomes [m] in PUS.

(86) loan rule final m:

[nasal] --> m / ___ #

There is no [r] phone in PUS. All 'r' sounds in loan words are replaced by [h], as shown in examples 9, 10, 11, 14, 19, 20, and 21 above.

(87) loan rule r/h:

r ---> h

The sound combination [aŋ] in Indonesian words generally results in the phoneme /æ/ in PUS. Examples 12 and 13 show this occurring. I also find that Indonesian place names which end in 'ang' are pronounced with the corresponding PUS [æ], e.g., Salu Tabang is pronounced [salutæbæ] (name of village). I have encountered examples of other words which may or may not be loan words but which show the same kind of correlations such as jarang —> [mædæhæ] 'seldom'. This word is interesting because we can see that the root [dæhæ] shows (in addition to the aŋ—>[æ] correspondence) both the j—>[d] and the r—>[h] correspondences.

There are also a number of words yet to be totally PUS-ized such as examples 1, 2, and 10 above. It is not known whether these words will one day further change so that, for instance, 'barang' becomes *[bæhæ] or whether the current pronunciation [báham] will remain as the accepted form. We saw in ŋ-insertion that [ŋ] is inserted after /æ/ and before the suffix am. It may be that an historical study will show [am] to be underlying /æ/. In the neighboring languages of Toraja-Saqdan and Mamasa we frequently encounter [aŋ] corresponding to [æ] in PUS words.[12] An example of this is the word [bábaŋ] in Mamasa which is [bæbæ] 'merely' in PUS.

[12]See the appendix for further examples.

(88) loan rule aŋ/æ:

aŋ # ---> æ #

Loan words of similar structure may not always be altered in the same way. An example of this is the pronunciation of an Indonesian word which ends in a non–nasal consonant. Example 7, selimut —> [salímu?] shows what often happens, i.e., the final consonant becomes [?]. The same occurrence is found in examples 17, 18, 19, and 22. (Note that in examples 17 and 18 the word medial consonant geminates.)

(89) loan rule final consonant/[?]:

$$\begin{array}{cc} C & V \\ 1 & 2 \end{array} \begin{bmatrix} C \\ -\text{nasal} \end{bmatrix}_{3} \; \#_{4} \; \text{---> } 1 \; (1) \; 2 \; ? \; 4$$

Not all non–nasal consonant final Indonesian loan words are changed in this way. Another type of alternation is illustrated in examples 14, 15 and 16 where instead of just the replacement of the final consonant with [?] an echo vowel is inserted after the final consonant, before the glottal stop.

(90) loan rule final consonant/echo vowel:

$$\begin{array}{c} V \\ 1 \end{array} \begin{bmatrix} C \\ -\text{nasal} \end{bmatrix}_{2} \; \#_{3} \; \text{---> } 1 \; 2 \; 1 \; ? \; 3$$

At this point it is not clear why both of the above processes exist nor when each comes into effect.

Examples 20 and 21 demonstrate what happens when the loan word has a non–PUS consonant cluster. In each case a vowel is inserted between the consonants. Presently I do not know what factors determine which vowel is to be inserted.

In example 22 the consonant cluster kt in 'tuan dokter' becomes the geminate [tt]. There is no [kt] cluster within the morpheme in PUS. Example 23 demonstrates the process of continuantization as the Indonesian cluster ns becomes [ss] in PUS. However, in this case continuantization takes place within the morpheme, not across a morpheme boundary.

APPENDIX

THE PHONEME /æ/

In this appendix some PUS words which have the phoneme /æ/ are presented along with corresponding words in neighboring languages. Patterns are noted but no historical–comparative conclusions are drawn.

PUS	Tabulahan	Mamasa	Toraja	Gloss
ækæʔ		aŋkaʔ	aŋkaʔ	raise
ænæʔ	ænæʔ	anak	anak	child
æne		ane	ane	termite
æwæ		awaŋ	awaŋ	bran
balintotæʔ	balintohteʔ	balintotok		woodpecker
bæbæ		babaŋ		merely
bækæ	bækæŋ	buaŋ	buaŋ	molar
bækkæ	bika	bakka		crack open
bælæ		balaŋ	balaŋ	lungs
bænnæ	bænnæŋ	bannaŋ	bannaŋ	thread
bætæ	bætæŋ	bataŋ	bataŋ	stem
beluæʔ	beluhæʔ	beluak	beluak	hair
bihæ	bihæŋ	biraŋ		female
bintæ	bintæŋ	bintoen	bintoen	star
bisæʔ		bissak	bissak	split w/ axe
bokæʔ	boŋaʔ	moŋŋaʔ		rowdy
boʔbæʔ	bombeŋ	boʔbok	boʔbok	dig hole
bolæʔ		bolok	bolok	nasal mucus
bombæ	bombeŋ[13]			crevice
boŋkæ		buŋkoŋ	bukkaŋ	crab
bulintæ	bulinteŋ	bulintoŋ	bulittoŋ	tadpole
bundæ		bundaŋ	bundaŋ	boil
(sa)dækæm		daŋkan	daŋkan	span
dæŋguʔ	daŋkuʔ	daŋguruʔ	daŋguruʔ	hit
gæjæ		gayaŋ	gayaŋ	stab
hæŋæm	dihæŋæŋi	raŋanni	raŋanni	add
hoæ	huaŋ	ruaŋ[14]		inside
hossæʔ	hehsæʔ			mud
illæ		illoŋ	illoŋ	nose
issæ	iŋseŋ	issoŋ	issoŋ	mortar
kaledæʔ	kaleræʔ			armpit
kalibæmbæ		kalibambaŋ	kalibambaŋ	butterfly
kalimbuæ	timbu	kalimbuaŋ	kalimbuaŋ	spring
kasiæ	kaseæŋ	sia-siaŋ		fish gills
kædoʔ	pekaroʔ	kadoʔ		to latch
kæhæ	kæhæŋ	karaŋ	karaŋ	to work
mækætiʔ	mækætiŋ	makattiʔ	makatiʔ	to itch
kebættæ	kehæhtæŋ	kebattaŋ	kebaʔtaŋ	pregnant
kohhæʔ	kohheʔ	korrok	kumorrok	to snore

[13]The Tabulahan gloss for this form is 'a dug hole'. While differing in gloss from PUS, the form is clearly related.
[14]The Mamasa form is restricted to the meaning 'stomach'.

PUS	Tabulahan	Mamasa	Toraja	Gloss
kollæ-kollæ	kado-kado	garro-garro		esophagus
kumondæ	lumumpa?	kumondoŋ	ma?dondo	to run
læŋæm		laŋŋan	laŋŋan	to go up
læntæ	lantaŋ[15]	lantaŋ	lattaŋ	garden house
læppæ?	læhpæ?	mellopa	tikaloppak	blister
leæ	leaŋ			cave
lembæ	lembæŋ	lembaŋ	lembaŋ	valley
lempæ	lempæŋ	lempaŋ	lempaŋ	turn
limbæ	le?be?	limboŋ	limboŋ	pond
lippæ?	lihpæ?	lippak		explode
litæ?		litak	litak	ground
lolæ	loleŋ	lolok	loloŋ	to flow
lolæ?	lolo		lolo	treetop
londæ	londoŋ[16]	londaŋ	londoŋ	male
lo?bæ	lo?baŋ	lo?baŋ	lo?baŋ	empty
malotæ	maloteŋ	malotoŋ	malotoŋ	black
mæne?	mane?	manuk	manuk	chicken
ma-pæi?	mapæi?	mapai?	mapai?	bitter
pæppæ?	pahse	pappak	pa?pak	tree bark
pæso?	paso?	pasok	paku	to nail
poppæ?	pohpe?	poppok	po?pok	ghoul
sædæ	sua	sadaŋ	sadaŋ	mouth
masæe	masae.	masae	masae	long time
sægæ	sæŋkæŋ			injure
sehæ	sehæŋ	seraŋ	seraŋ	nest
sæke?	saŋke?	sakke?		to tie
ma-sække?	masakke?	masakka?	masakka?	cold
sæmbæ?i	mambamba	sambakki	sambakki	hit with twig
sændæ?	sændæ?	sandak		try
sæpæi?	sæmpæi?	sappalli?		a moment
ma-siæ?	mabaya	masiaŋ	masiaŋ	bright
tææ?	daih	tae?	tae?	no, not
tæi	tæi	tai	tai	excrement
tæke	taŋke	taŋke	taŋke	branch
tællæ		tallaŋ	tallaŋ	k.o.bamboo
tæmpæ?	tæmpæ?	tampak	tampak	end
ma-tæsæ?		matasak	matasak	ripe
tondæ?		tondok	tondok	village
tontæm		tontoŋ	tontoŋ	same
tuæ?	tuæ?		tuak	palm wine
mæ-wæhhæm	mæhæhæŋ		ma?raŋ	thirsty

[15]The Tabulahan gloss for this form is 'raised platform below house'.
[16]The Tabulahan gloss for this form is limited to male chickens, i.e., roosters.

Correspondences of PUS [æ] found in Tabulahan:

	PUS		Tabulahan	Syllable
æ/a	mæne?	/	mane?	1
	pæso?	/	paso?	1
	masæe	/	masae	2
	dæŋgu?	/	daŋku?	1
æ/aŋ	hoæ	/	huaŋ	f[17]
	læntæ	/	lantaŋ	f
	leæ	/	leaŋ	f
	lo?bæ	/	lo?baŋ	f
	sæke?	/	saŋke?	1
æ/æŋ	bænnæ	/	bænnæŋ	f
	bætæ	/	bætæŋ	f
	bihæ	/	bihæŋ	f
	bintæ	/	bintæŋ	f
	kasiæ	/	kaseæŋ	f
	kæhæ	/	kæhæŋ	f
	kebættæ	/	kehæhtæŋ	f
	lembæ	/	lembæŋ	f
	lempæ	/	lempæŋ	f
	sægæ	/	sæŋkæŋ	1,f
	sehæ	/	sehæŋ	f
	tæko	/	taŋko	1
æ/e	balintotæ?	/	balintohte?	f
	kohhæ?	/	kohhe?	f
	poppæ?	/	pohpe?	f
æ/eŋ	bombæ	/	bombeŋ	f
	bulintæ	/	bulinteŋ	f
	issæ	/	iŋseŋ	f
	lolæ	/	loleŋ	f
	malotæ	/	maloteŋ	f
æ/e?	limbæ	/	le?be?	f
æ/oŋ	londæ	/	londoŋ	f
æ?/o	lolæ?	/	lolo	f
kæ/ŋa	bokæ?	/	boŋa?	f

[17]The abbreviation 'f' stands for 'final syllable'

Correspondences of PUS [æ] found in Mamasa and Toraja:

	PUS	Mamasa	Toraja	Syllable
æ/a	bækkæ	bakka		1,f
	dæŋgu?	daŋguru?	daŋguru?	1
	hæŋæm	raŋanni	raŋanni	1,2
æ?/ak	ænæ?	anak	anak	f[18]
	beluæ?	beluak	beluak	f
	bisæ?	bissak		f
æ/aŋ	ækæ?	aŋka?	aŋka?	1
	æwæ	awaŋ	awaŋ	f
	bæbæ	babaŋ		f
	bælæ	balaŋ	balaŋ	f
	bænnæ	bannaŋ	bannaŋ	f
	bætæ	bataŋ	bataŋ	f
	bihæ	biraŋ		f
	bundæ	bundaŋ	bundaŋ	f
	dækæm	daŋkan	daŋka	1
	gæjæ	gayaŋ	gayaŋ	f
	hoæ	ruaŋ		f
æ/oen	bintæ	bintoen	bintoen	f
æ?/ok	balintotæ?	balintotok		f
	bolæ?	bolok	bolok	f
	bo?bæ?	bo?bok	bo?bok	f
æ/oŋ	boŋkæ	buŋkoŋ	bukkaŋ	f
	bulintæ	bulintoŋ	bulittoŋ	f
	illæ	illoŋ	illoŋ	f

[18]The Mamasa form [ak] at the end of the word corresponds to [æ?] at the end of the PUS form. The [æ] form in the first syllable of the PUS form is expected as the phonemes /a/ and /æ/ never co–occur intramorphemically in PUS (see (50)).

REFERENCES

CAMPBELL, Philip J. 1989. *Some aspects of Pitu Ulunna Salu grammar: A typological approach.* Unpublished thesis. University of Texas at Arlington.

FRIBERG, Timothy, (ed.) 1987. UNHAS–SIL South Sulawesi sociolinguistic surveys: 1983–1987. *Workpapers in Indonesian Languages and Cultures*, Vol 5. Jayapura, Indonesia: Percetakan Universitas Cenderawasih.

HYMAN, Larry M. 1975. *Phonology theory and analysis.* New York: Holt, Rinehart and Winston.

KENSTOWICZ, Michael, and Charles KISSEBERTH. 1979. *Generative phonology description and theory.* New York: Academic Press.

KIPARSKY, Paul. 1968. *How abstract is phonology?* Bloomington: Indiana University Linguistics Club. Also in *Three dimensions of linguistic theory*, ed. by O. Fujimura. Tokyo: TEC 5–56.

MATTI, David. 1991. 'Phonology of Mamasa'. This volume.

SALOMBE, Cornelius. 1982. *Bahasa Toraja Saqdan proses morfemis kata kerja.* Jakarta: Penerbit Djambatan.

SCHANE, Sanford A. 1973. *Generative phonology.* Englewood Cliffs, N.J.: Prentice–Hall.

SIRK, Ülo. 1988. 'Towards the historical grammar of the South Sulawesi languages: Possessive enclitics in the postvocalic position.' in H. Steinhauer (ed), *Papers in Western Austronesian linguistics* Vol. 4, 283–302. Canberra: *Pacific Linguistics*, A–79.

STRØMME, Kåre J. 1987. 'UNHAS–SIL sociolinguistic survey: Kabupaten Polewali Mamasa, West–Central Section'. In Friberg (ed.), 17–40.

TAMMU J. and H. van der VEEN. 1972. *Kamus Toradja–Indonesia.* Rantepao: Yayasan Perguruan Kristen Toraja.

VEEN, H. van der. 1924. *Sa'dan–Toradja'se volksverhalen.* VBG LXV deel 2.