

BURUM MORPHOPHONEMICS

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1. INTRODUCTION

Burum is a Papuan language of the Finisterre-Huon group (McElhanon 1973).¹ Burum-Mindik is spoken by 8,700 people living in the Finschhafen District of the Morobe Province of Papua New Guinea. There are two dialects: Somba (referred in other papers as Burum and Wandahum), spoken in the Burum valley, has two sub-dialects: Wandahum and Yaknge; and Siawari (also referred to as Kuat and Mindik), spoken in the Mindik area which is the central part of the Kuat valley. This paper will use the Somba dialect as the basis for the analysis with some notes about the Siawari dialect.

This paper is a presentation of the Burum morphophonemic system drawing heavily on various previous papers.² The previous papers treated the major processes fairly accurately although the minor rules were generally not discussed. I felt that these rules were important to the understanding of the complete phonological system of Burum. Also the previous discussions were in a prose form and I wanted to present the data and formulate the rules in a more standard generative format. I begin the presentation with a short description of the Burum phonemes and their distribution. This is followed by a description of the morphophonemic system, starting with the more general, cross-language rules and going on to the minor rules that affect relatively few forms. Appendices contain lists of all rules discussed, and of affixes together with other grammatical and phonological information.

2. DESCRIPTION AND DISTRIBUTION OF PHONEMES

The phonemes of Burum are presented in the following chart:

p	t	k	kw	i		u
b	d	g	gw	e	ə	o
	s				a	
	ts					
	dz					
w	r	ɣ				
	l					
	y					
m	n	ŋ				

¹ See Olkkonen (1985) for further details of the phonological system.

² Most of the data for this paper came from various papers written by Soini and Kaija Olkkonen, the SIL team working in the language, and from personal communication with them.

The /ɣ/ phoneme occurs only between vowels, v__v, for example [moyot] 'one'.³ The phoneme /w/ has two allophones: [β] which occurs preceding front vowels and [w] which precedes non-front vowels, for example [βem] 'axe', [mewə] 'like that'. Although the voiceless stop phonemes and the alveolar sonorants have several allophones, they are not relevant to this paper.

The spirants /w, r, ɣ/ act together in the morphophonemic processes as counterparts of the bilabial, alveolar, and velar voiceless stops. This is in common with other Finisterre-Huon languages (McElhanon 1973). While in Nabak, a neighbouring related language, these spirants are in allophonic variation with stops, in Burum they are contrastive phonemes initially and between vowels.

[pəndandaŋ]	thunder	[wəlaə]	pencil
[səpa]	fence	[bərəsəwə]	handicraft
[taraŋ]	insect sp.	[rarep]	fence post
[ətək]	hiccough	[arakŋi]	forest
[maluku]	dress	[muɣut]	tree sp.

Stress is predictable in the language, falling always on the first syllable, and is therefore not marked in this paper.

3 The following abbreviations are used:

<	derives	Nas	Nasal
→	becomes	NOM	NOMINALISER
#	word boundary	non pers	nonpersonal
+	morpheme boundary	OBJ	Object
α	either + or – Feature	ODG	Object Degemination
∅	zero morpheme	ONI	Object Nasal Insertion
*	non-occurring form	pers	personal
~	alternates with	PL	PLURAL
ant	anterior	PN	Pronoun
C	Consonant	PNA	Pronoun Nasal Assimilation
CD	Consonant Deletion	PRES	PRESENT TENSE
cons	consonantal	PST	PAST
cont	continuant	SA	Stop Assimilation
cor	coronal	SF	Surface Form
D	Deletion	SG	SINGULAR
del rel	delayed release	SING	Singular
DG	Degemination	SmD	Stem /m/ Deletion
DU	DUAL	son	sonorant
DV	Devoicing	SP	Spirantisation
F	Feature	sp	species
FNA	Future Nasal Assimilation	SpC	Spirantisation-Compound
FUT	FUTURE TENSE	syll	syllabic
GF	Glide Formation	TOP	Topic morpheme
HAB	HABITUAL ASPECT	TP	Topic Rule
HmD	Habitual /m/ Deletion	UF	Underlying Form
I	Insertion	V	Vowel
indef	indefinite	VC	Voicing
interr	interrogative	Vd	voiced
ISD	Identical Sequence Drop	VH	Vowel Harmony
Lat	Lateral	VI	voiceless
Loc	Locative	VNI	Verbal Nasal Insertion
MS	Manuscript	y-E	y-Epenthesis
N-S	Nasal-Stop		

Many of the morphological operations result in consonants adjoining across morpheme boundaries. The following generalisations can be made about phonetic consonant clusters in Burum:

1. There is a general prohibition against geminates.
2. Voiceless stops /p, t, k/, nasals, and /l/ are the only consonants allowed in syllable final position either followed by a consonant or word finally.
3. All the above phonemes can be followed by nasals.

[kwetni]	my name
[kekma:k]	kind of arrow
[βemni]	my axe
[əlnɔ:p]	true

4. All syllable-final consonants can be followed by stops and affricates that agree in voicing.

[nengi]	your sister
[seŋgwe]	kunai-grass
[kwəlbə]	figus tree
[esap:kəm]	temptation

5. Except for the allowable sequences of voiceless stop followed by nasal, consonant clusters which do not agree in voicing occur only in reduplicated forms and compounds.

[welenkwekwe]	messenger (<i>welen</i> 'message' + <i>kwekwe</i> 'shaking')
[kinkin]	standing

6. The continuants /r, w, y, ʝ/ are never part of consonant sequences, in either position.

3. MAJOR RULES AND PROCESSES

There are four major processes that affect all types of words in simple forms and in compound and reduplicated forms. These are: degemination, spirantisation, voicing and y-epenthesis. These processes are language-wide.

3.1 DEGEMINATION

A general process of degemination is quite widespread throughout the Burum language.

Consider the noun forms in (1)-(2):

	_____#	his_____	my_____	
(1)a.	<i>sep</i>	<i>sepŋi</i>	<i>sepni</i>	blood
b.	<i>nup</i>	<i>nupŋi</i>	<i>nupni</i>	garden
(2)a.	<i>nen</i>	<i>nenŋi</i>	<i>neni</i>	sister
b.	<i>sin</i>	<i>sinŋi</i>	<i>sini</i>	leaf

We can see that the root for 'blood' is /sep/ in all forms while 'garden' is /nup/, /nen/ is 'sister', and /sin/ is 'leaf'. In the second column /-ŋi/ is 'his'. In the third column in (1a)-

(1b), 'my' is clearly /-ni/ but in (2a)-(2b) in the third column where we would expect /nenni/ and /sinni/, we see deletion of the /n/ when it occurs next to another /n/.

Now consider the forms in (3)-(5):

	___#	about___	with___	a little___	
(3)a.	<i>sep</i>	<i>sepka</i>	<i>sepuk</i>	<i>septap</i>	blood
b.	<i>nup</i>	<i>nupka</i>	<i>nupuk</i>	<i>nuptap</i>	garden
(4)a.	<i>kwet</i>	<i>kwetka</i>	<i>kwetpuk</i>	<i>kwetap</i>	name
b.	<i>kosoyot</i>	<i>kosoyotka</i>	<i>kosoyotpuk</i>	<i>kosoyotap</i>	story
(5)a.	<i>kelak</i>	<i>kelaka</i>	<i>kelakpuk</i>	<i>kelaktap</i>	grease
b.	<i>kaβik</i>	<i>kaβika</i>	<i>kaβikpuk</i>	<i>kaβiktap</i>	hook

The unaffixed form in the first column shows the root morpheme that can be isolated in each form across the row. Notice the roots end in voiceless consonants /p, t, k/. Now looking down each column, the suffixes can be isolated as well: /-ka/ 'about' in the second column, /-puk/ 'with' in the third column and /-tap/ in the fourth column, all beginning with voiceless stops. Notice that in forms where we would expect a geminate cluster, only one consonant occurs, for example [sepuk] from /sep+puk/ 'with blood'; [kwetap] from /kwet+tap/ 'a little name'. Thus there is a deletion when two identical consonants come together.

Degemination also occurs in verbs. Consider the forms in (6)-(7):

	PST.2SG	PST.2/3PL	PRES.3SG	
(6)a.	<i>etnəŋ</i>	<i>etket</i>	<i>etsa</i>	come down
b.	<i>kotnəŋ</i>	<i>kotket</i>	<i>kotsa</i>	go up
(7)a.	<i>eknəŋ</i>	<i>eket</i>	<i>ektsa</i>	see
b.	<i>aknəŋ</i>	<i>aket</i>	<i>aktsa</i>	do

Here the verb stems can be isolated in the first column as /et/ 'come down', /kot/ 'go up', /ek/ 'see' and /ak/ 'do'. The present tense is /-ts/. The Subject person-number markers are /-nəŋ/ '2 Singular', /-ket/ '2/3 Plural' and /-a/ '3 Singular'. The past tense marker is Ø. In the second column in (7a)-(7b) we would expect /ekket/ [eket] and /akket/ [aket] and in the third column in (6a)-(6b) we would expect /ettsa/ [etsa] and /kottsas/ [kotsa]. Again there is degemination.

A rule accounting for the above observations can be formulated as follows:

Degemination (DG)

C → Ø / C ___
[αF] [αF]

This rule states that a consonant is deleted when it occurs following another identical consonant.

Degemination also applies to reduplicated forms as shown in (8c)-(8e), as compared to (8a)-(8b) where no degemination occurs:

(8)a.	<i>tokotoko</i>	meeting	cf. <i>toko</i>	to meet
b.	<i>malmal</i>	life	cf. <i>mal</i>	to live
c.	<i>korakorak</i>	ear pain	cf. <i>korak</i>	ear wax

- d. *mutsumutsum* tree type cf. *mutsum* tree type
 e. *tatat* sitting cf. *tat* to sit

3.2 SPIRANTISATION

Taking the same noun root morphemes which were presented in examples (3)-(5), consider the forms in (9)-(11):

- | | | | | |
|--------|------------------|------------------|------------------|--------|
| | my___ | only___ | really___ | |
| (9)a. | <i>sepni</i> | <i>sewək</i> | <i>sewap</i> | blood |
| b. | <i>nupni</i> | <i>nuwək</i> | <i>nuwap</i> | garden |
| (10)a. | <i>kwetni</i> | <i>kwerək</i> | <i>kwerap</i> | name |
| b. | <i>kosoyotni</i> | <i>kosoyorək</i> | <i>kosoyorap</i> | story |
| (11)a. | <i>keləkni</i> | <i>keləyək</i> | <i>keləyəp</i> | grease |
| b. | <i>kaβikni</i> | <i>kaβiyək</i> | <i>kaβiyap</i> | hook |

The suffixes may be isolated as /-ni/ 'my', /-ək/ 'only' and /-ap/ 'really'. In (9a)-(9b) we see the stem final stop /p/ in the first column alternates with the spirant /w/ in the second and third columns. Similarly in (10a)-(10b) we see the stop /t/ alternating with the spirant /r/. While in (11a)-(11b) the stop /k/ alternates with the spirant /ɣ/. The environment of this alternation of stop versus spirant is that the spirant occurs preceding a vowel. These three spirants /w, r, ɣ/ form a natural class together which I will call 'spirants' following McElhanon's (1979) description of Nabak, a neighbouring related language. Looking at the forms in (3)-(5) and (9)-(11), the base forms of roots could end in either a stop or a spirant because spirants and voiceless stops never contrast in stem final position in Burum. I choose to derive the more marked spirant from the less marked voiceless stop, that is the underlying forms are /sep/ 'blood', /nup/ 'garden', /kwet/ 'name', /kosoyot/ 'story', /kelək/ 'grease', and /kaβik/ 'hook'. A rule can be formulated as follows:

Spirantisation (SP)

$$\left[\begin{array}{c} \text{C} \\ -\text{sonorant} \\ -\text{voice} \end{array} \right] \rightarrow \left[\begin{array}{c} +\text{cont} \\ +\text{voice} \end{array} \right] / \text{V} _ \text{+V}$$

This rule states that a voiceless stop consonant becomes a voiced spirant when it occurs between vowels across a morpheme boundary.

Consider now some forms that seem to violate this Spirantisation rule from (3)-(4), repeated here as (12)-(13):

- (12)a. *sepuk* with blood
 b. *nupuk* with a garden
 (13)a. *kwetəp* a little name
 b. *kosoyotəp* a little story

Here we seem to have the voiceless stops where the continuant should be according to the Spirantisation rule. However, note that the underlying structure of these forms is a geminate cluster. Degemination evidently applies after Spirantisation thus bleeding the spirantisation of voiceless stops from geminate clusters. This is true of polymorphemic forms.

In monomorphemic forms the spirants are more frequent than stops between vowels. There is a surface contrast then between voiceless stops and spirants between vowels (see §2). I could assume that any example of voiceless stop between vowels is underlyingly a geminate cluster even though it may not be transparent, that is [səpa] from /səppa/ 'fence' and [maluku] from /malukku/ 'dress'. One reason for this assumption is that there is no morpheme which ends in a voiceless stop which does not undergo spirantisation preceding a vowel. Even though the Spirantisation rule refers to a morpheme boundary because of other forms, it does not detract from the fact that it also applies to mono-morphemic forms. This leads to a more systematic understanding of the Burum phonological system. However, I will not make this assumption a part of the phonological system at this time.

One of the implications of the geminate stop reduction analysis is that it might be possible to remove the voiced spirants from the phonemic inventory. This would result in an inventory that is more similar to other related languages (McElhanon 1979). This proposal works well for the velar consonants as /V/ only occurs between vowels. However the bilabial and alveolar continuants do not have this restriction, that is they occur initially: /wai/ 'thorn, prickle', /wem/ '(stone) axe', /roro/ 'grass (sp)', /rai/ 'storm'.

Sample derivation:

UF	#sep+ək#	#sep+ni#	#kwet+ək#	#sep+puk#	#səppa#
SP	sew+ək	-----	kwet+ək	-----	-----
DG	-----	-----	-----	sep+uk	səpa
SF	[sewək]	[sepni]	[kwetək]	[sepuk]	[səpa]
	only blood	my blood	only a name	with blood	fence

Verbs also show the affects of Spirantisation. Consider the forms in (14)-(15):

	PST.2SG	PST.1SG	PST.1PL	
(14)a.	<i>etnəŋ</i>	<i>eral</i>	<i>erin</i>	come down
b.	<i>kotnəŋ</i>	<i>koral</i>	<i>korin</i>	go up
(15)a.	<i>eknəŋ</i>	<i>eɣal</i>	<i>eɣin</i>	see
b.	<i>aknəŋ</i>	<i>ayal</i>	<i>aɣn</i>	do

The past tense marker is Ø. The '2SG' is /-nəŋ/, the '1SG' marker is /-al/ and '1PL' is /-in/. The verb stems already established in (6)-(7) now show the same alternation of stop and continuant as shown in the nouns in (9)-(11). So the Spirantisation Rule applies to verbs as well.

Sample derivation:

UF	#ek+Ø+al#	#kot+Ø+al#	#ak+ts+al#	#et+ts+al#
SP	eɣ+al	kor+al	-----	-----
DG	-----	-----	-----	et+s+al
SF	[eɣal]	[koral]	[aktsal]	[etsal]
	I saw	I went up	I go down	I come

This rule does not usually apply to reduplicated forms, as shown in (16)-(17), and (19) or to compound words, as shown in (18):

(16)	<i>əsʊpəsʊp</i>	full of warmth	not *əsʊwəsʊp	cf. /əsʊp/	warm
(17)	<i>imʊtimʊt</i>	dream	not *imʊrimʊt	cf. /imʊt/	picture

- (18) *imutoyoyo* drawing not **imuroyoyo* cf. /oyoyo/ drawing
 - (19) *kaka* the coming not **kaya* cf. /ka/ to come
- However, look at the forms in (20)-(22):
- (20) *eret* the going down cf. /et/ go down
 - (21) *ayak* the doing cf. /ak/ do
 - (22) *awanəm* spouses cf. /ap/ husband + /anəm/ wife

A possible difference between (16)-(19) and (20)-(22) is that the latter have identical vowels and the consonant is morpheme final. Consequently I propose to formulate a corollary Spirantisation rule to account for this:

Spirantisation-Compound (SpC)

$$\begin{bmatrix} C \\ -\text{sonorant} \\ -\text{voice} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{cont} \\ +\text{voice} \end{bmatrix} / \text{v} ______ \# \text{v} \\ \text{[}\alpha\text{F]} \text{ ______ [}\alpha\text{F]} \text{}$$

This rule states that a voiceless stop consonant becomes a voiced spirant if it occurs between two like vowels across a word boundary and the consonant is word final.

The fact that such a rule applies to the process of reduplication as well as compounding shows that Reduplication is a word building process. This rule is morphologically restricted in that it applies to compounds and reduplications that are derivational. The Spirantisation and Degemination rules apply to other derivational processes, for example /amət/ 'cold' + /i/ 'verbaliser' > /aməri/ 'get cold'. This can be demonstrated by a continuum showing three points with what rules do and do not apply at each level.

2 separate words		Compound/Reduplication		Inflection/Derivation	
-SP	-DG	-SP	+DG	+SP	+DG
		+SpC			

Sample derivation:

UF	#imut#RED#	#et#RED#	#ap#anəm#
RED	imut#imut	et#et	-----
SpC	-----	er#et	aw#anəm
SF	[imutimut]	[eret]	[awanəm]
	dream	the going down	spouses

3.3 VOICING

Another fairly widespread alternation is in stop voicing. Compare the nouns in (23) (repeated from (3a) and (4a)) with those in (24):

- | | | | | |
|--------|----------------|---------------|---------------|-------|
| | with_____ | about_____ | a little_____ | |
| (23)a. | <i>kwetpuk</i> | <i>kwetkə</i> | <i>kwetəp</i> | name |
| b. | <i>sepuk</i> | <i>sepkə</i> | <i>septəp</i> | blood |

- (24)a. *sinbuk* *singə* *sindəp* leaf
 b. *dzəlbuk* *dzəlgə* *dzəldəp* throat

The noun roots in (23)-(24a) have been seen above: /sep/ 'blood' and /sin/ 'leaf' and /kwet/ 'name' in (3a). In (24b) the noun root morpheme can be isolated as /dzəl/ 'throat'. Notice that the suffixes show alternations /-puk~-buk/ 'with', /-kə~-gə/ 'about' and /-təp~-dəp/ 'a little'. The initial stop of the suffixes is either voiced or voiceless. The voiceless consonant follows a stem final voiceless stop and voiced consonant a stem final voiced consonant. The choice of the base form is at this point arbitrary.

To help determine the base form, consider the further forms in (25):

- with___ about___ a little___
 (25)a. *alabuk* *alagə* *alatəp* friend
 b. *baubuk* *baugə* *bautəp* pig

Here the noun roots can be isolated as /ala/ 'friend' and /bau/ 'pig'. After a vowel final root, the initial bilabial or velar consonant of the suffix is voiced and the alveolar consonant is voiceless. Since there is no consonant in the environment to predict the form of the suffix, I assume the underlying forms are /-buk/ 'with', /-gə/ 'about' and /-təp/ 'a little'.

Similarly in verbs in (26)-(27):

- | | PST.2/3PL | PRES.3SG | FUT.1PL | |
|--------|---------------|---------------|---------------|-----------|
| (26)a. | <i>etket</i> | <i>etsa</i> | <i>etpin</i> | come down |
| b. | <i>kotket</i> | <i>kotsa</i> | <i>kotpin</i> | go up |
| (27)a. | <i>anget</i> | <i>andza</i> | <i>anbin</i> | go |
| b. | <i>malget</i> | <i>maldza</i> | <i>malbin</i> | be |
| (28)a. | <i>kaget</i> | <i>katsa</i> | <i>kabin</i> | come |
| b. | <i>dziget</i> | <i>dzitsa</i> | <i>dzibin</i> | say |

Example (26a)-(26b) (repeated from (6)) shows the verb stems as /et/ 'come down' and /kot/ 'go up' which end in voiceless stops. In (27a)-(27b) the verb stems can be isolated as /an/ 'go' and /mal/ 'be' ending in voiced consonants. Examples (28a)-(28b) then show stems that end in vowels: /ka/ 'come' and /dzi/ 'say'. The suffixes show the same alternation of voiced and voiceless stops as seen above in the nouns. Since the voicing is unpredictable following a vowel, the base forms for the suffixes will be the forms that appear following a vowel: /-get/ '2/3PL', /-ts/ 'present tense' and /-b/ 'future tense'.⁴

A rule accounting for the above observations can be formulated as follows:

⁴ It is interesting to note that the bilabial and velar stops are voiced following a vowel while the alveolar obstruents are voiceless in the same environment.
 /alabuk/ with a friend /kabin/ we will come
 /alagə/ about a friend /kaget/ they come
 /alatəp/ a little friend /katsa/ he comes
 Thus voicing is somewhat predictable across morpheme boundaries but is still contrastive within morphemes, e.g.
 /gipi/ ginger /gəbun/ tree sp.
 /butun/ insect sp. /kude/ not
 /baka/ bring /baga/ cane type

Voicing Rule (VC)

$$\begin{array}{ccc} C & \rightarrow & [\alpha \text{ voice}] / C \text{ ---} \\ [-\text{sonorant}] & & [\alpha \text{ voice}] \text{ ---} \end{array}$$

This rule states that a stop consonant agrees in voicing when it occurs following another consonant.

Condition: The rule does not apply where the form is reduplicated or a compound, that is /kinkin/ 'the standing' cf. /kin/ 'to stand', /təmuntəmun/ 'snail' cf. /təmun/ 'shell'.

This rule then explains the devoicing that occurs when an suffix beginning with a voiced stop occurs after a stem that ends with a voiceless consonant and similarly the voicing that occurs when an suffix beginning with a voiceless stop occurs after a stem that ends with a voiced consonant.

Sample derivations:

UF	#ka+Ø+get#	#et+Ø+get#	#an+Ø+get#	#an+ts+a#	#ka+b+in#
VC	-----	et+ket	-----	an+dz+a	-----
SF	[kaget]	[etket]	[anget]	[andza]	[kabin]
	they came	they came down	they went	he goes	we will come

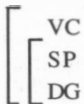
Voicing must be ordered before Degemination as the opposite order would result in unacceptable forms. Voicing feeds Degemination, that is provides forms that meet the environment of Degemination.

UF	#ek+Ø+get#	#ek+Ø+get#
DG	-----	VC ek+ket
VC	ek+ket	DG ek+et
	*[ekket]	SF [eket] they saw

As seen in the previous section, Spirantisation must be ordered before Degemination as Degemination results in forms that meet the environment of Spirantisation, to which Spirantisation does not apply.

UF	#sep+buk#	#sep+buk#
VC	sep+puk	VC sep+puk
DG	sep+uk	SP -----
SP	sew+uk	DG sep+uk
	*[sewuk]	SF [sepuk] with blood

Therefore Spirantisation must be ordered before Degemination and Voicing must be ordered before Degemination but there is no crucial ordering between Voicing and Spirantisation.



Spirantisation affects the final segment while Voicing affects the initial segment.⁵ McElhanon (1973:6) states for the rest of the Western Huon Family, "The rule generally is that when a morpheme which ends with a final voiceless unreleased stop or begins with an initial voiced stop co-occurs contiguous to a vowel, the voiced or voiceless stop is replaced by a flat spirant (or lateral) phoneme at the corresponding point of articulation."

3.4 Y-EPENTHESIS

Consider the verb forms in (29):

	PST.2/3PL	PST.1PL	PST.1SG	PST.2/3DU	
(29)a.	<i>anget</i>	<i>anin</i>	<i>anal</i>	<i>anoyot</i>	go
b.	<i>malget</i>	<i>malin</i>	<i>malal</i>	<i>maloyot</i>	be

To establish the verbal suffixes, I use the verb stems previously discussed in (27), which can be isolated as /an/ 'go' and /mal/ 'be'. This leaves /-get/ '2/3PL', /-al/ '1SG', /-in/ '1PL', and /-oyot/ '2/3DU'. As previously shown, 'past' is Ø.

Consider the verbs in (30)-(35):

	PST.2/3PL	PST.1PL	PST.1SG	PST.2/3DU	
(30)a.	<i>meget</i>	<i>mein</i>	<i>meyal</i>	<i>meyoyot</i>	take
b.	<i>neget</i>	<i>nein</i>	<i>neyal</i>	<i>neyoyot</i>	eat
(31)a.	<i>dziget</i>	<i>dziin</i>	<i>dziyal</i>	<i>dziyoyot</i>	say
b.	<i>osiget</i>	<i>osiin</i>	<i>osiyal⁶</i>	<i>osiyoyot</i>	be unable
(32)a.	<i>kaget</i>	<i>kain</i>	<i>kayal</i>	<i>kayoyot</i>	come
b.	<i>bakaget</i>	<i>bakain</i>	<i>bakayal</i>	<i>bakayoyot</i>	bring
(33)a.	<i>oyoget</i>	<i>oyoin</i>	<i>oyoyal</i>	<i>oyoyoyot</i>	cook
b.	<i>tokoget</i>	<i>tokoin</i>	<i>tokoyal</i>	<i>tokoyoyot</i>	meet
(34)a.	<i>turuget</i>	<i>turuin</i>	<i>turuyal</i>	<i>turuyoyot</i>	cover
b.	<i>utuget</i>	<i>utuin</i>	<i>utuyal</i>	<i>utuyoyot</i>	chop
(35)a.	<i>gəyəget</i>	<i>gəyəin</i>	<i>gəyəyal</i>	<i>gəyəyoyot</i>	bite
b.	<i>ərəget</i>	<i>ərəin</i>	<i>ərəyal</i>	<i>ərəyoyot</i>	pull

In the first two columns, all roots end in vowels: /e/ in (30) (/me/ 'take', /ne/ 'eat'); /i/ in (31) (/dzi/ 'say', /osi/ 'be unable'); /a/ in (32) (/ka/ 'come', /baka/ 'bring'); /o/ in (33) (/oyo/ 'cook', /toko/ 'meet'); /u/ in (34) (/turu/ 'cover', /utu/ 'chop'); /ə/ in (35) (/gəyə/ 'bite', /ərə/

⁵ In some language areas, in one word with the morpheme /-təp/, the initial stop spirantises although it is morpheme initial not final as the SP rule specifies: /morərəp/ 'childhood' < /morə/ 'child' + /təp/ 'a little'. It is possible that this form acts more like a compound than an affixed word and fits more closely the environment of the Spirantisation-Compound rule of like vowels.

⁶ In examples (30)-(31) in the third column the actual phonetic forms of these verbs are [meal] 'I took', [neal] 'I ate', [dzial] 'I said' and [osial] 'I was unable'. There is no phonetic contrast and a neutralisation between [ea] and [eye] as well as [ia] and [iya] so it is arbitrary which phonetic form is used. The form with the /y/ offers more consistency with the other verb forms. There is a low level phonetic rule which deletes the /y/ in these forms.

stop /t/, 3) Nasals and the lateral, 4) Vowels [-High] and 5) Vowels [+High]. The vowels need to be divided in the affixes as the [+High] vowels provoke different changes from the other vowels. Degemination deletes one of the sequences of consonants and y-Epenthesis adds a segment to separate sequences of vowels.

I now present in chart form the different possibilities when stems and affixes come together.

Final seg.	Initial segment				
	Vd stop	Vl stop	Nas/Lat	V[-High]	V[+High]
Vl stop ⁸	VC(DG) ⁹	Ø(DG)	Ø	SP	SP
Nasal/Lat	Ø	VC	Ø(DG)	Ø	Ø
Vowels	Ø	Ø	Ø	y-E	Ø

In the following sections I discuss rules that are confined in scope to a few forms or subset of words, but the major processes still affect these forms as well.

4. PRONOUN PROCESSES

The following are a set of rules that deal exclusively with pronouns.

4.1 NASAL ASSIMILATION

Consider the pronoun and noun forms in (36):

	Topic	only	with	of	
(36)a.	<i>tosatʃan</i>	<i>tosatʃanək</i>	<i>tosatʃambuk</i>	<i>tosatʃaŋgə</i>	some
b.	<i>toninan</i>	<i>toninanək</i>	<i>toninambuk</i>	<i>toninaŋgə</i>	leader

The two roots can be separated first: /tosat/ 'some' and /to/ 'leader'. The final morphemes in the second, third and fourth columns are clitics: /-ək/ 'only' (see also (9)-(11)), /-buk/ 'with' and /-gə/ 'of' (see also (23)-(24)). The morpheme next to the root shows the possession: /-ŋ/ '3SG possessive' (which occurs with all types of pronouns) and /-nin/ '1PL possessive' as in /alanini/ 'our friend' and /alaŋi/ 'his friend'. The final /i/ is absent when other suffixes occur. The '3SG possessive' marker /-ŋ/ often occurs with adjectives and indefinite pronouns and loses some of the the meaning of 'possession'. The remaining morpheme 'topic' shows the alternation /-an~-am~-aŋ/. This is the form of the Topic clitic which occurs with indefinite pronouns and possessed nouns (see 6.10 for Topic rule). The final nasal assimilates to the point of articulation of the following stop. The alveolar nasal /n/ occurs preceding silence or a vowel in the first and second columns so I take /-an/ to be the base form.

Thus the forms in (36) can be diagrammed or parsed as

a.	<i>tosat+ŋ+an</i>	<i>tosat+ŋ+an+ək</i>	<i>tosat+ŋ+am+buk</i>	<i>tosat+ŋ+aŋ+gə</i>
	some+3S+TOP	some+3S+TOP+only	some+3S+TOP+with	some+3S+TOP+of

⁸ I have combined the voiceless stops realising that /p/ does not occur stem finally in verbs.

⁹ As a result of the Voicing rule, there may be identical consonants that will then undergo Degemination.

- b. *to+nin+an* *to+nin+an+ək* *to+nin+am+buk* *to+nin+aŋ+gə*
 leader+1PL+TOP ldr+1PL+TOP+only ldr+1PL+TOP+with ldr+1PL+TOP+of

Consider the forms in (37):

- | | | | |
|--------|---------------|--------------|-------|
| | with_____ | of_____ | |
| (37)a. | <i>dabuk</i> | <i>dagə</i> | who |
| b. | <i>nəmbuk</i> | <i>nəŋgə</i> | 1SG |
| c. | <i>nembuk</i> | <i>nəŋgə</i> | 1PL |
| d. | <i>yembuk</i> | <i>yeŋgə</i> | 2/3PL |

The forms in (37) show the same kind of alternation in another morpheme as in (36). The first and second columns show /-buk/ 'with' and /-gə/ 'of' as the final morphemes. The stems can be separated as /da/ 'who', /n/ '1 person' and /y/ '2/3 person'. The number of the pronoun can be distinguished by the vowel in the forms of the Nominaliser clitic which occurs with personal pronouns, /ə/ 'singular' and /e/ 'plural'. The Nominaliser clitic also shows the same nasal alternation as shown in (36): /-əm~-əŋ/ and /-em~-eŋ/. The final nasal assimilates to the point of articulation of the following stop. There are no forms in Burum with these two allomorphs of this morpheme preceding a vowel. As the alveolar nasal does not occur, I take as the base form the /VN/ form for this clitic. It would be possible in some theoretical frameworks to posit an abstract underlying form of /VN/ for the Nominaliser clitic. The advantage would be that it would show the similarity to the Topic clitic more clearly. However, I have decided on principle not to posit abstract forms in this paper.

The following rule can be formulated to account for the above observations:

Pronoun Nasal Assimilation (PNA)

C	→	[a point]	/	_____	+	C
[+nasal]						[a point]
[Topic/NOM Clitic]						

This rule states that a nasal in the Nominaliser/Topic clitic becomes the same point of articulation as the stop it precedes across a morpheme boundary.

The reference to the Nominaliser clitic in the rule is there because there are forms that allow /ŋb/ as a sequence: /deŋ+bin/ 'we will scatter', also /ŋd/ /diŋ+diŋi/ 'upright, straight', /ŋg/ /nen+gi/ 'your sister'. All of these clusters are across morpheme boundaries.

Sample derivations:

UF	#to+ŋ+an+gə#	#tosat+ŋ+an+ək#	#n+eŋ+buk#
PNA	to+ŋ+aŋ+gə	-----	n+em+buk
SF	[toŋaŋgə]	[tosatŋanək]	[nembuk]
	of its leader	only some	with us

4.2 VOICED STOP SPIRANTISATION

There is a corollary process to the Spirantisation rule as discussed in §2.2. Consider the forms in (38) (repeating (37b), (37d) forms as (38a), (38b)):

- | | | | | |
|--------|--------------|---------------|--------------|-------|
| | Topic | with_____ | of_____ | |
| (38)a. | <i>nəŋən</i> | <i>nəmbuk</i> | <i>nəŋge</i> | 1SG |
| b. | <i>yeŋən</i> | <i>yembuk</i> | <i>yeŋgə</i> | 2/3PL |
| c. | <i>gəŋən</i> | <i>gəbuk</i> | <i>gəyə</i> | 2SG |

The new forms in (38c) can be isolated as follows: /g/ '2SG root' and /ə/ '2SG Nominaliser'. The change can be seen in the third column with the alternation of the Possessive clitic as /-gə~-yə/. The 2SG form of the Nominaliser clitic is the only form that does not have a final consonant so the initial voiced stop of the Possessive clitic is between vowels, the same environment that triggers SP for voiceless stops. Observe that this alternation occurs between like vowels as does Spirantisation-Compound rule. Notice also that this process only occurs with the velar stop in [gəyə], not the bilabial one in [gəbuk].

The following rule can be formulated to account for the above observations:

Spirantisation-1 (SP-1)

$$\left[\begin{array}{l} \text{-cont} \\ \text{-cor} \\ \text{-ant} \\ \text{+voice} \end{array} \right] \rightarrow \text{[+cont]} \quad / \quad \text{V} \quad + \quad \text{---V} \\ \text{[aF]} \qquad \qquad \qquad \text{[aF]} \\ \text{[2nd singular]}$$

This rule states that the velar voiced stop becomes the velar spirant when it occurs between like vowels and across a morpheme boundary.

Condition: This rule only applies to 2SG.

Note: The condition of [2SG] is added because there are other forms that meet the phonological environment but Spirantisation-1 or Spirantisation-Compound rule does not apply, for example /meget/ 'you (pl)/they took'.

Sample derivations:

UF	#n+əŋ+gə#	#g+ə+gə#	#g+ə+buk#
SP-1	-----	g+ə+yə	-----
SF	[nəŋgə]	[gəyə]	[gəbuk]
	of mine	of yours	with yours

5. OBJECT PREFIXING VERBS

There is a small finite set of verbs that require a prefix showing the object of the verb. When the object marker is affixed to the verb stem, several morphophonemic changes take place.

The following are two complete paradigms of object prefixing verbs. I will keep the subject person-number and tense constant throughout: 3SG present.

	burns	shoots	
(39)a.	<i>noyotsa</i>	<i>neritsa</i>	he__me
b.	<i>goyotsa</i>	<i>geritsa</i>	he__you
c.	<i>oyotsa</i>	<i>eritsa</i>	he__him
d.	<i>nekoyotsa</i>	<i>nekeritsa</i>	he__us two
e.	<i>ekoyotsa</i>	<i>ekeritsa</i>	he__you/them two
f.	<i>nenggoyotsa</i>	<i>nengeritsa</i>	he__us
g.	<i>enggoyotsa</i>	<i>engeritsa</i>	he__you/them

Comparing the columns with each other, we can see a similarity of forms in what is analysed as the object prefix. The morpheme complex /tsa/ is '3SG present', and the verb stems can be shown most clearly with the '3SG object' which has been analysed as Ø, /oyo/ 'burn' and /eri/ 'shoot'. The following chart summarises the person-number of the object prefix:

	SG	DU	PL
1	<i>n-</i>	<i>nek-</i>	<i>neŋg-</i>
2	<i>g-</i>	<i>ek-</i>	<i>eŋg-</i>
3	∅		

5.1 ə-INSERTION

The examples in (39) showed verb stems that began with a vowel. Consider now the following verbal forms in (40):

	3SG.OBJ	1SG.OBJ	2SG.OBJ	2/3PL.OBJ	
(40)a.	<i>eriyək</i>	<i>neriyək</i>	<i>geriyə</i>	<i>eŋgeriyək</i>	he shot___
b.	<i>mosotək</i>	<i>nəmosotək</i>	<i>gəmosotək</i>	<i>eŋgəmosotək</i>	he left___
c.	<i>məriyək</i>	<i>nəməriyək</i>	<i>gəməriyək</i>	<i>eŋgəməriyək</i>	he anointed___

The forms in (40a) have been repeated from (39a)-(39c), (39g) except that past tense is used. The morpheme /yək-~ək-/ is '3SG past'. The 3SG object prefixes show the verb stems most clearly because it is ∅, /eri/ 'shoot', /mosot/ 'leave' and /məri/ 'anoit'. In the second, third and fourth columns, the object prefixes show the following alternations: /n--nə-/ '1SG', /g--gə-/ '2SG' and /eŋg--eŋgə-/ '2/3PL'. The /ə/ is either inserted before a consonant or deleted before a vowel. I would like to take the option of insertion because /ə/ as a central weak vowel is often inserted in other languages and there is no evidence to prove that it is deleted in Burum. So I take as the base form the alternation without /ə/ and insert it by rule.

ə-Insertion (ə-I)

∅ → /ə/ / # C___ + C
C
[OBJ Prefix]

This rule states that a /ə/ is inserted between two consonants when the first consonant is word initial or follows another consonant in the object prefix.

The specification of object prefix in this rule is needed as some of the consonants involved, for example [nm], are acceptable consonant clusters in other word types, for example /nenmungi/ 'your siblings'.

Sample derivation:

UF	#n+oɣol+∅+ək#	#n+mosot+∅+ək#
ə-I	-----	nə+mosot+ək
SF	[noɣolək]	[nəmosotək]
	he called me	he left me

5.2 SPIRANTISATION REVISITED

In §3.2 I formulated a rule (Spirantisation-1) in which a voiced stop, /g/, becomes a continuant between vowels in 2SG.

Spirantisation-1 (SP-1)

$$\left[\begin{array}{l} -\text{cont} \\ -\text{ant} \\ -\text{cor} \\ +\text{voice} \end{array} \right] \rightarrow [+cont] \quad / \quad \text{V} + ___ \text{V} \begin{array}{l} [\alpha F] \quad [\alpha F] \\ [2SG] \end{array}$$

This rule states that the velar voiced stop becomes the velar spirant when it occurs between vowels and across a morpheme boundary.

Condition: This rule only applies to 2SG.

This same process applies to two verbs in the object prefixing set of verbs. Consider the forms in (41):

- | | | | |
|--------|-----------------|-----------------|--------------------|
| | 1SG.OBJ | 2SG.OBJ | |
| (41)a. | <i>nun̄guma</i> | <i>guv̄yuma</i> | he will hit___ |
| b. | <i>niṅgima</i> | <i>giȳma</i> | he will give to___ |

Disregarding the vowel quality and the velar nasal for the moment, the '1SG object' is /nuṅ~niṅ-/ and '2SG object' is /gu~gi-/. The future tense is /-m/ and /-a/ is '3SG subject'. The verb stems can be seen in the first column as /gu/ 'hit' and /gi/ 'give to' with the second column showing the alternates /yu/ and /yi/ respectively. Here the voiced velar stop has become a spirant in the same environment as the pronoun forms. The Spirantisation-1 applies as it is still 2SG. (See the end of this section for full derivations.)

5.3 VOWEL HARMONY

Let us deal with the other alternation of the vowels exhibited by the object prefixes in (41), disregarding the velar nasal (see next section).

Here the verb stems are /gu~yu/ 'hit' and /gi~yi/ 'give to'. The base form is the stop form with spirantisation accounted for by Spirantisation-1 (See §4.2). The stop form is the base form. Now the object person markers show the following alternation: /nuṅ~niṅ-/ '1SG object' and /gu~gi-/ '2SG object'. The vowel in the object marker harmonises with the first stem vowel in these two verbs. These are the only two verbs in this set of verbs that have high vowels as the first vowel. From the discussion above in §4.1 (ə-Insertion), the derived form for the object prefix is /Cə/ before consonants. So a rule can be formulated as follows:

Vowel Harmony (VH)

$$\begin{array}{l} /ə/ \\ [\text{OBJ Prefix}] \end{array} \rightarrow \left[\begin{array}{l} +\text{High} \\ \alpha\text{Back} \end{array} \right] / _____ (\text{C}) + \text{C} \begin{array}{l} \text{V} \\ +\text{High} \\ \alpha\text{Back} \end{array}$$

This rule states that a /ə/ that is in the object prefix becomes High and agrees in Backness with a following high vowel. There may be one to two intervening consonants and there must be at least one or two, across the morpheme boundary, as the vowel /ə/ only occurs before consonants.

Vowel Harmony must be ordered after ə-I so that the /ə/ will be present for Vowel Harmony to apply.

$$\left[\begin{array}{l} \text{əI} \\ \text{VH} \end{array} \right]$$

5.4 OBJECT NASAL INSERTION

Another process in the object prefixing set of verbs is nasal insertion. Consider the forms in (42)-(43) (repeated here from (40) and (41)):

- | | | | |
|--------|--------------------|------------------|--------------------|
| | 1SG.OBJ | 2SG.OBJ | |
| (42)a. | <i>nəmosotma</i> | <i>gəmosotma</i> | he will leave___ |
| | b. <i>nəmərima</i> | <i>gəmərima</i> | he will anoint___ |
| (43)a. | <i>nuŋguma</i> | <i>guɣuma</i> | he will hit___ |
| | b. <i>niŋgima</i> | <i>giɣma</i> | he will give to___ |

In (42)-(43) the verb stems can be seen as /mosot/ 'leave', /məri/ 'anoint', /gu~ɣu/ 'hit' and /gi~ɣi/ 'give to'. The object prefixes show the alternations /nə--nuŋ--niŋ-/ '1SG object' and /gə--gu--gi-/ '2SG object'. The high vowel changes are explained above in §4.3 Vowel Harmony. In the 1SG object forms there has been an /ŋ/ added to the alternate that precedes a velar stop which is the initial consonant of the verb stem. There are only two verbs that have velar stops in the stem: /gu/ 'hit' and /gi/ 'give to'. However, if other verbs are found which have a velar stop initially, I would expect the same insertion to occur. The UF could include the /ŋ/. It would then require a rule to delete the /ŋ/ everywhere except for preceding /g/. It would be unnatural to insert the /ə/ between two consonants within the same morpheme. So I take the basic form without /ŋ/ and insert in these two cases. So a rule can be formulated as follows:

Object Nasal Insertion-1 (ONI)

$$\emptyset \rightarrow \begin{bmatrix} +nas \\ -cor \\ -ant \end{bmatrix} / \quad V \text{ --- } + \begin{bmatrix} C \\ -cor \\ -ant \end{bmatrix} \quad \begin{bmatrix} C \\ -cor \\ -ant \end{bmatrix} \quad [1SG \text{ obj}]$$

This rule states that a velar nasal is inserted before a morpheme break in 1st singular object when the stem initial consonant is velar.

I do not think that there are crucial ordering restrictions within these three rules (Spirantisation-1, Vowel Harmony and Object Nasal Insertion) except that applying Vowel Harmony before Spirantisation-1 provides a more plausible phonetic environment for Spirantisation-1 to take place in. I have tried to write the rules to show the rules' independence. The Object Nasal Insertion must also be ordered after ə-Insertion so that the latter rule has the right environment to apply.

$$\left[\begin{array}{l} \text{ə-Insertion} \\ \text{Vowel Harmony} \\ \text{Object Nasal Insertion} \end{array} \right]$$

The following sample derivations show the application of all these rules already presented.

UF	#n+gu+m+a#	#g+gi+m+a#	#n+mosot+m+a#	#g+eri+m+a#
ə-I	nə+gu+m+a	gə+gi+m+a	nə+mosot+m+a	g+eri+m+a
VH	nu+gu+m+a	gi+gi+m+a	-----	-----
SP-1	-----	gi+yi+m+a	-----	-----
ONI	nun+gu+m+a	-----	-----	-----
SF	[nunɡuma]	[ɡiyima]	[nəmosotma]	[gerima]
	he'll hit me	he'll give to you	he'll leave me	he'll shoot me

5.5 OBJECT DEGEMINATION

Consider the forms in (44)-(45):

	IPL.OBJ	2/3PL.OBJ	1DU.OBJ	
(44)a.	<i>nengəmosotma</i>	<i>engəmosotma</i>	<i>nekəmosotma</i>	he will leave ___
b.	<i>nengəmərīma</i>	<i>engəmərīma</i>	<i>nekəmərīma</i>	he will anoint ___
(45)a.	<i>nenguma</i>	<i>enguma</i>	<i>nekuma</i>	he will hit ___
b.	<i>nengīma</i>	<i>engīma</i>	<i>nekīma</i>	he will give to ___

These are the same verb stems as in (42)-(43). The object markers show the alternations: /nengə-~neŋ-/ '1PL object', /engə-~eŋ-/ '2/3PL object' and /nekə-~ne-/ '1DU object'. The difference in the verb stems is that in (44) the initial consonant is /m/ whereas in (45) the initial consonant is /g/. The /ə/ Insertion has somehow been blocked in the /g/-initial verb stems and a velar consonant has been deleted. Looking at the Underlying Form for these examples in (45) we can see that two velar consonants start out next to each other.

#neng+gi# #neng+gu# #eng+gu# #eŋ+gi# #nek+gu# #nek+gi#

In the plural forms Degemination could apply immediately (if so ordered) while in the dual form Voicing must first apply before Degemination. However, Degemination must be blocked from applying to singular forms, that is /giyi/ #g+gi# '2SG object + give'. So a corollary Degemination rule can be formulated.

Object Degemination (ODG)

C → Ø / C + ___
 [αF] [αF]
 [-singular]
 [OBJ Prefix]

This rule states that a consonant in the Object Prefix is deleted across a morpheme boundary when it follows a like consonant in nonsingular forms.

The deletion of the verb stem initial consonant will block the ə-Insertion for these forms. Voicing and Object Degemination must then be ordered before ə-Insertion to take away the environment that ə-Insertion could apply to. Voicing must be ordered before Object Degemination to make sure the right forms are present.

[Voicing
 { Object Degemination
 [ə-Insertion

5.6 GLIDE FORMATION

Some of the forms of this set of verbs show an alternation of a glide and high vowel. Consider the forms in (46):

	1SG.OBJ	3SG.OBJ	
(46)a.	<i>noyotsa</i>	<i>oyotsa</i>	he burns___
b.	<i>nuangitsa</i>	<i>wangitsa</i>	he takes from___
c.	<i>nuwatanggətsa</i>	<i>wuatanggətsa</i>	he persecutes___

As seen previously in (39ff.), the '1SG object' is /n-/ and '3SG object' is \emptyset as shown clearly in (a). The person-number marker for '3SG' is /-a/ and /-ts~-ds/ is present tense. In the (b-c) forms then we see an alternative of the vowel /u/ with the glide /w/, which occurs word initially.

The following rule can be formulated to account for the above observations:

Glide Formation (GF)

v	→	[-syll]	/	#	_____	v
[+High]						[-High]

This rule states that a high vowel becomes a glide when it occurs word initially preceding a non-high vowel.

Note in /uwutanga/ 'persecute' the vowel retains some syllabicity so that the sequence /ww/ does not occur.

5.7 ANOMALIES

There are several different members of the set of object prefixing verbs which are anomalous, that is they do not follow the pattern of other like verb stems or they are the only example of a process and it is difficult to show the validity of a certain rule. The situations concerned are the 3SG forms of /gu/ 'hi' and /gi/ 'give' and /yəyə/ 'bite' and /ami/ 'take, marry'.

5.7.1 'HIT' AND 'GIVE'

Now consider the form in (47):

	1SG.OBJ	1PL.OBJ	3SG.OBJ	
(47)a.	<i>nugguma</i>	<i>nənguma</i>	<i>kwetsa</i>	he will hit___
b.	<i>niŋgima</i>	<i>nəngima</i>	<i>wəngima</i>	he will give to___

The verb stems in all person and numbers except 3SG are or can be derived from /gu/ 'hit' and /gi/ 'give' (see also (41), (43), (44)). The 3SG form of /gi/ does not have \emptyset as the object marker, instead it adds a morpheme /wəŋ/ which is the one verb in the object prefixing set to do so. One possible explanation can come from comparing this form /wəngima/ 'he will give him' to /wəngitma/ 'he will take from him' in which /wəngit/ is the verb stem. Semantically these are almost the same action and the Burum people may have modified one of the forms to reflect that they are the same action to them. As for the alternation /kwe~gu/ 'hit', there would be a way to derive /kwe/ from /gu/ as the Underlying Form. It would require at least

two more rules that only apply to this form: Initial Devoicing and e-Insertion-1 (which I present without features).

Initial Devoicing Rule (IDV)

/g/ → /k/ / #___

This rule states that the voiced velar stop becomes voiceless when it occurs word initially.

e-Insertion-1 (eI-1)

∅ → /e/ / #C V___
[-sonorant]
[verb stem]

This rule states that an /e/ is inserted following a stop consonant and vowel when the consonant is word initial in the verb stem.

Note: This verb must be marked as [+Devoicing] and [+e-Insertion-1] in the lexicon. These two must be ordered before the Glide Formation rule, which also must be changed to include CuV in the environment. It seems too complicated for just one form and there should be a more elegant way to deal with this situation. For now I will take the option of a morphologically determined rule and list both forms in the lexicon.

/gu/ → /kwe/ / [3SG]

The Underlying Form /gu/ becomes /kwe/ in '3SG'.

5.7.2 'TAKE' AND 'BITE'

Consider the verb forms in (48):

	1SG.OBJ	2SG.OBJ	2/3PL.OBJ	3SG.OBJ	
(48)a.	<i>nəmiyək</i>	<i>gəmiyək</i>	<i>eŋgəmiyək</i>	<i>amiyək</i>	he took___
b.	<i>nəyəyək</i>	<i>gəyəyək</i>	<i>eŋgəyəyək</i>	<i>yəyəyək</i>	he bit___

From the first three columns it appears that the verb stems here are /ə/ initial or C initial with /ə/ insertion. Looking at the last column '3SG object', we see a difference in the verb stem. There is an alternation: /əmi~ami/ 'take' and /əyə~yəyə/ 'bite'. These are the only two verb stems with a possibility of /ə/ initially and the result is different in each one. I hesitate to posit a set of rules that would choose one of these alternatives as the base form. The Underlying Form /ami/ for 'take' must delete the /a/ and allow ə-Insertion to take place or change the /a/ to /ə/ in word medial positions where /a/ does occur in other words. The Underlying Form /əmi/ must change the /ə/ to /a/ in word initial position. One of the difficulties with this analysis is that /ə/ does occur word initially in other words: /əne/ 'for nothing'. The second Underlying Form option /əmi/ seems more satisfying if the /ə/ occurs in more forms. Rather than posit a rule to change the vowel, I would like to make another morphologically determined rule.

/əmi/ → /ami/ / [3SG]

The Underlying Form /əmi/ become /ami/ in '3SG'.

The alternations for 'bite' offer a different situation. The phoneme /y/ is either added to 3SG or deleted following a consonant. It seems plausible to delete the /y/ when it follows a

consonant across a morpheme boundary. The phoneme /y/ never participates in any consonant clusters and the deletion blocks ə-Insertion. The following rule can be formulated to account for the above observations.

y-Deletion (y-D)

$$\begin{bmatrix} +\text{son} \\ -\text{syll} \\ -\text{cons} \end{bmatrix} \rightarrow \emptyset / \text{C} ___$$

This rule states that a /y/ is deleted when it occurs following a consonant.

Note: A morpheme boundary is not needed here as /y/ would only occur following a consonant when two morphemes come together. The Underlying Form /yəyə/ would then need to be marked [+y-Deletion] in the lexicon. This rule would necessarily be ordered before ə-Insertion

I would like to present full derivations of some forms in Object Prefixing verbs to show how the rules in this set interact.

	Full derivations:			
UF	#n+eri+m+a#	#n+gu+m+a#	#nek+gi+m+a#	#g+gi+m+a#
VC	----	----	nek+ki+m+a	----
ODG	----	----	ne+ki+m+a	----
ə-I	----	nə+gu+m+a	----	gə+gi+m+a
VH	----	nu+gu+m+a	----	gi+gi+m+a
ONI	----	nuŋ+gu+m+a	----	----
SP-1	----	----	----	gi+yi+m+a
GF	----	----	----	----
SF	[nerima] he'll shoot me	[nuŋguma] he'll hit me	[nekima] he'll give to us two	[giyima] he'll give to you
UF	#uangit+m+a#	#g+mosot+m+a#		
VC	----	----		
ODG	----	----		
ə-I	----	gə+mosot+m+a		
VH	----	----		
ONI	----	----		
SP-1	----	----		
GF	wangit+m+a	----		
SF	[wangitma] he'll take from him	[gəmosotma] he will leave you		

6. MINOR RULES

There are various forms that seem to show assimilation to the point of articulation of the neighbouring consonant. The changes are usually restricted to certain classes of affixes or stems.

6.1 NASAL ASSIMILATION

Consider these verb forms in (49)-(51):

- | | | | |
|--------|------------------|---------------|-----------|
| | FUT.1SG | FUT.2SG | |
| (49)a. | <i>kamam</i> | <i>kaman</i> | come |
| | b. <i>memam</i> | <i>meman</i> | take |
| (50)a. | <i>etmam</i> | <i>etman</i> | come down |
| | b. <i>kotmam</i> | <i>kotman</i> | go up |
| (51)a. | <i>anmam</i> | <i>anman</i> | go |
| | b. <i>deḡmam</i> | <i>deḡman</i> | scatter |

In the future tense, which is marked with /-m/ in these forms, the person markers are slightly different from the past or present set: /-am/ '1SG' and /-an/ '2SG'. The verb stems in (49)-(51) are the same as we have seen previously with the addition of /deḡ/ 'scatter'.

Now consider the verbs in (52):

- | | | | |
|--------|-----------------|--------------|-----|
| | FUT.1SG | FUT.2SG | |
| (52)a. | <i>ekḡam</i> | <i>ekḡan</i> | see |
| | b. <i>akḡam</i> | <i>akḡan</i> | do |

The verb stems are unchanged from (12): /ek/ 'see' and /ak/ 'do'. And the person markers stay the same as in (49)-(51). There is an alternation of the future tense marker: /-m~-ḡ/. This change in the point of articulation follows a change in the verb stem final consonant: the /ḡ/ occurs after the velar stop /k/. Notice that the velar nasal does not affect the morpheme; that is /deḡmam/ (54b). As the /m/ is not predictable and more common, it will be the base form. A rule to account for the above observations can be formulated as follows:

Future Nasal Assimilation-2 (FNA)

$$\begin{array}{c} \left[\begin{array}{c} C \\ +nasal \end{array} \right] \\ \text{[Future]} \end{array} \rightarrow \begin{array}{c} \left[\begin{array}{c} -cor \\ -ant \end{array} \right] \\ / \end{array} \begin{array}{c} \left[\begin{array}{c} C \\ +stop \\ -cor \\ -ant \end{array} \right] \\ + \text{---} \end{array}$$

This rule states that a nasal that is future tense becomes a velar nasal following a velar stop across a morpheme boundary.

The Future specification is needed here as the sequence /km/ does occur in other forms: /ekmalal/ 'I have habitually seen' and /akmalal/ 'I have habitually done'.

6.2 OTHER FUTURE TENSE FORMS

As was seen in examples (49)-(51), the future morpheme is /m/ in most cases. Consider to the forms in (53):

- | | | | | |
|--------|-----------------|--------------|--------------|-----------|
| | 1SG | IDU | 1PL | |
| (53)a. | <i>kamam</i> | <i>kabit</i> | <i>kabin</i> | come |
| | b. <i>etmam</i> | <i>etpit</i> | <i>etpin</i> | come down |
| | c. <i>anmam</i> | <i>anbit</i> | <i>anbin</i> | go |

The future morpheme shows this alternation /-m~-b/ with the stop occurring in the 1st person, nonsingular forms. The stem has no effect on it. With /m/ as the base form a rule can be written as follows, making it as general as possible:

Nasal-Stop Rule (N-S)

$$\left[\begin{array}{c} C \\ +nasal \\ \alpha F \\ \text{[Future]} \end{array} \right] \rightarrow \left[\begin{array}{c} -nasal \\ \alpha F \end{array} \right] / \left[\begin{array}{c} \text{1st person} \\ -singular \end{array} \right]$$

This rule states that the nasal in the future tense becomes a stop at the same point of articulation in 1st person, nonsingular forms.

There is a further change in the future. Look at the forms in (54):

- (54)a. 1SG *ekɲam* 1DU *ekit* 1PL *ekin* see
 b. *akɲam* *akit* *akin* do

Here the nonsingular forms of /k/ final verb stems have a further deletion. And it seems to occur preceding the high vowel. So a rule could be formulated to delete the Future morpheme before a high vowel even though this seems unlikely.

Tense Deletion (TD)

$$\text{[Future]} \rightarrow \emptyset / \left[\begin{array}{c} C \\ +stop \\ -cor \\ -ant \end{array} \right] \text{ — } \left[\begin{array}{c} V \\ +High \end{array} \right]$$

This rule states that the future morpheme (whatever quality it is) is deleted between a velar stop and a high vowel.

UF	#ek+m+in#	#ek+m+an#
FNA	----	ek+N+an
N-S	ek+b+in	----
TD	ek+∅+in	----
VC	----	----
SF	[ekin]	[ekɲan]
	we will see	you will see

However by simply ordering the Future Nasal Assimilation and Nasal-Stop before Voicing, Spirantisation and Degemination, the same form would be obtained, so Tense Deletion is not needed.

UF	#ka+m+in#	#et+m+it#	#ek+m+am#	#ek+m+in#
FNA	----	----	ek+ŋ+am	ek+ŋ+in
N-S	ka+b+in	et+b+it	----	ek+g+in
VC	----	et+p+it	----	ek+k+in
SP	----	----	----	----
DG	----	----	----	ek+∅+in
SF	[kabin]	[etpit]	[ekɲam]	[ekin]
	we will come	we.2 will come down	I will see	we will see

6.3 IDENTICAL SYLLABLE REDUCTION

Consider the forms in (55)-(57):

- PST.2/3DU
- (55)a. *maloyot* be
 b. *anoyot* go
- (56)a. *eroyot* come down
 b. *koroyot* go up
- (57)a. *ayot* do
 b. *eyot* see

Comparing these forms with (30)-(35), the verb stems in (55) can be isolated as /mal/ 'be' and /an/ 'go'. In (56), /er/ 'come down' and /kor/ 'go up' are apparent, which we derive from base forms /et/ and /kot/ (see Spirantisation rule). In (57), the stems seem to be /ay/ 'do' and /ey/ 'see', with base forms /ak/ and /ek/. We are left with the '2/3DU' marker which shows the alternation /-oyot~-ot/. In (57) /oy/ has been deleted, giving /ayot/ and /eyot/ for the expected forms /ayoꞑot/ and /eyoꞑot/. Notice that the Spirantisation rule in this case yields two identical syllables, that is /yoꞑo/, and one of them is dropped.

A rule that deletes this sequence can be formulated:

Identical Sequence Drop (ISD)

C1 V1 → Ø / C(V) ____ C1 V1

This rule states that a CV sequence is deleted when it occurs preceding an identical sequence medially following a consonant and an optional vowel.

Condition: Sequence must be the result of some morphophonemic process as there are acceptable forms with identical syllables; that is /indzarere/ 'lazy', /dzidzibu/ 'type of mushroom'.

6.4 STOP ASSIMILATION

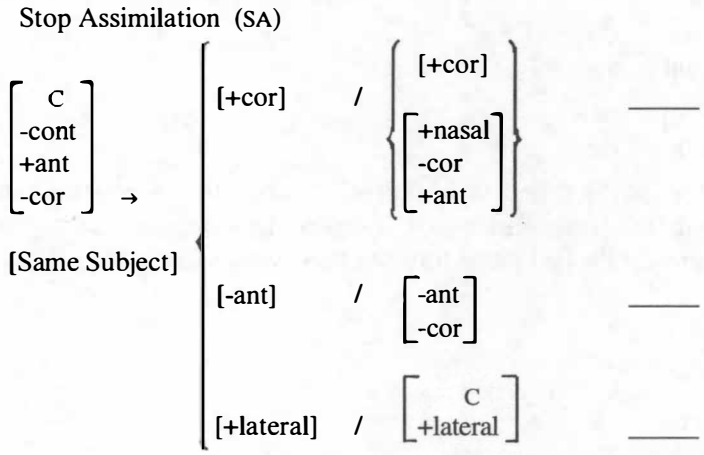
The Same Subject verb marker shows alternations in form. Consider the forms in (58)-(62):

- __and
- (58)a. *dzeba* burn
 b. *memba* take
- (59)a. *anda* go
 b. *deꞑda* scatter
- (60)a. *sayata* cry
 b. *eta* come down
- (61)a. *mala* be
 b. *ala* put
- (62)a. *eka* see
 b. *aka* do

Most of these verb stems have been discussed previously, so I will not list them. The various alternations of the Same Subject morpheme are as follows: /-ba (58)~-da (59)~-a (60)-(62)/. The initial stop changes point of articulation and some are deleted altogether. The final

segment of the verb stem determines the changes to be effected. I assume as with other rules that the base form is that which occurs following a vowel as in (58a) /dzeba/.

A proposed rule then must assimilate /b/ to the preceding consonant so that they agree in features except for voicing. In the environment following a nasal that is not bilabial (see also (59)), the stop assimilates to the alveolar point of articulation. For example, following an alveolar stop /t/, the base form changes to a /d/ and then is devoiced according to the Voicing rule and then undergoes degemination. This also preserves phonetic similarity (see also (60)). So a rule can be written as:



This rule states that a labial stop in the Same Subject morpheme becomes an alveolar stop following an alveolar consonant or a nonlabial nasal. It becomes a velar following a velar stop consonant. It also becomes a lateral following a lateral consonant.

The Same Subject must be part of the rule as the consonant sequences /nb/ /kun+buk/ ‘more, again’, /ŋb/ /kriŋputput/ ‘k.o. insect’ and /lb/ /kəlbot/ ‘a bush animal’ all occur.

The Siawari dialect seems to have collapsed two parts of the rule so the /k/ final stems have the alveolar alternation: for example /ekta/ ‘see and (Siawari)’. It has also taken the form following a vowel and has applied Spirantisation rule to it, for example /dzewa/ ‘burn and (Siawari)’.

Stop Assimilation must be ordered before Voicing and Degemination in order to feed those rules.

Sample derivations:

UF	#deŋ+ba#	#mal+ba#	#et+ba#	#ek+ba#
SA	deŋ+da	mal+la	et+da	ek+ga
VC	-----	-----	et+ta	ek+ka
DG	-----	mal+a	et+a	ek+a
SF	[deŋda]	[mala]	[eta]	[eka]
	scatter and	be and	come down and	see and

6.5 STEM FINAL /m/

There are two verb stems in the Somba dialect that have forms where an /m/ is present in a few forms but is otherwise deleted. Most consonant final stems show no alternation. In word final position, vowel final verb stems take /m/ as an infinitive marker and consonant stems do not. Consider the forms in (63)-(65):

	PRES.1SG	Infinitive	
(63)a.	<i>aldzal</i>	<i>al</i>	put
	b.	<i>mətsal</i>	<i>mət</i> know
(64)a.	<i>katsal</i>	<i>kam</i>	come
	b.	<i>dzitsal</i>	<i>dzim</i> say
(65)a.	<i>metsal</i>	<i>mem</i>	take
	b.	<i>netsal</i>	<i>nem</i> eat

In (63), the verb stems are /al/ 'put' and /mət/ 'know'. In (64), the verb stems can be isolated as /ka/ 'come' and /dzi/ 'say'. And in (65), it seems that the stems are /me/ 'take' and /ne/ 'eat'. However consider the first plural forms of these same verbs in (66)-(68):

	FUT.1PL	
(66)a.	<i>albin</i>	put
	b.	<i>mətpin</i> know
(67)a.	<i>kabin</i>	come
	b.	<i>dzibin</i> say
(68)a.	<i>membin</i>	take
	b.	<i>nembin</i> eat

The future 1st plural marker is /-in/ and the future marker here is /-b~-p/ (see §5.3). The consonant final stems in (63) and (66) and the vowel final stems in (64) and (67) remain the same. When we compare (68) with (65), we see an alternation in these stems as /ne~nem/ 'eat' and /me~mem/ 'take'. The /m/ shows up preceding /b/ but there is nothing else to predict the occurrence of /m/ there. If we posit that this /m/ is part of the stem and is deleted in all cases except before /b/, it satisfies the environment. In all other forms, /nem/ and /mem/ behave like vowel final stems. It is also possible that the nasal at the beginning of the stem may be causing the /m/ to be retained or even inserted before the /b/. I have no evidence at the moment which would prove conclusively one way or the other. The patterns so far in Burum tend to give more plausibility to the stem /m/ deletion as no other process is governed by nonadjacent segments. So a rule can be written as follows:

Stem /m/ Deletion (SmD)

$$\left[\begin{array}{l} +nas \\ +ant \\ -cor \end{array} \right] \rightarrow \emptyset / \text{---} \left\{ \begin{array}{l} V \\ C \\ -cor \\ +ant \end{array} \right\}$$

[Verb stem]

This rule states that the verb stem final /m/ is deleted in non-word final positions before a vowel or consonant that is not bilabial.

Sample derivations:

UF	#al+b+in#	#mem+b+in#	#nem+ts+al#
SmD	-----	-----	ne+ts+al
SF	[albin]	[membin]	[netsal]
	we will put	we will take	I eat

6.6 HABITUAL MARKER

Consider the forms in (69)-(70):

	HAB.PRES.1SG	HAB.PST.1SG	
(69)a.	<i>anaktsal</i>	<i>anmalal</i>	go
b.	<i>eraktsal</i>	<i>etmalal</i>	come down
(70)a.	<i>kamaktsal</i>	<i>kamalal</i>	come
b.	<i>memaktsal</i>	<i>memalal</i>	take

The past habitual marker is /-mal/ which occurs immediately following the verb stem before the tense markers or person-number markers. The habitual present shows the alternation /-ak~-mak/.¹⁰ The alternation beginning with a vowel occurs after consonant final stems, that is /an/ 'go', and the alternation with a consonant follows vowel final stems, that is /ka/ 'come'. So the stem final segment determines the allomorph. Nothing in the environment necessarily predicts the insertion of /m/ so I take the /m/ alternation as the base form, that is /-mak/. A rule can be written as follows:

Habitual m-Reduction (HmD)

$$\left[\begin{array}{l} +nas \\ +ant \\ -cor \end{array} \right] \rightarrow \emptyset / C + ____$$

[Habitual]
[-Past]

This rule states that the /m/ in the habitual, non-past marker is deleted following a consonant.

This rule must take place before the Spirantisation rule to ensure the correct form, that is in [eraktsal] < /et+mak+ts+al/.

Sample Derivations:

UF	#ka+mak+ts+al#	#et+mak+ts+al#
HmD	-----	et+ak+ts+al
SP	-----	er+ak+ts+al
SF	[kamaktsal]	[eraktsal]
	I habitually come	I habitually come down

¹⁰ There could be a relationship between /-mal/ 'habitual past' and /mal/ 'to be' and /-ak, -mak/ 'present habitual' and /ak/ 'to do'. However I do not have enough information to make a decision at this time. These verbs would be likely candidates for a relationship of this kind.

6.7 NASAL INSERTION

Consider the forms in (71)-(72):

	PST.1SG	PST.3SG	PST.1DU	PST.1PL	
(71)a.	<i>malal</i>	<i>malək</i>	<i>malit</i>	<i>malin</i>	be
b.	<i>anal</i>	<i>anək</i>	<i>anit</i>	<i>anin</i>	go
(72)a.	<i>deɲnal</i>	<i>deɲnək</i>	<i>deɲnit</i>	<i>deɲnin</i>	scatter
b.	<i>usuɲnal</i>	<i>usuɲnək</i>	<i>usuɲnit</i>	<i>usuɲnin</i>	clean

The verb stems in (71) are /mal/ 'be' and /an/ 'go'. In (72), the verb stems can be isolated as /deɲ/ 'scatter' and /usuɲ/ 'clean'. This leaves the following alternation of the person-number markers:

/-al~-nal/	1SG
/-ək~-nək/	3SG
/-it~-nit/	1DU
/-in~-nin/	1PL

The /n/ occurs following a velar nasal stem final consonant. I assume the vowel initial suffix is the base form as it occurs in more environments.

Verbal Nasal Insertion (VNI)

$$\emptyset \rightarrow \begin{bmatrix} +nas \\ +ant \\ -cor \end{bmatrix} / \begin{bmatrix} +nas \\ -ant \\ -cor \end{bmatrix} + \text{---} v \text{ [Verb stem]}$$

This rule states that an alveolar nasal is inserted after a velar nasal in a verb stem before a vowel of a suffix across a morpheme boundary.

6.8 i REDUCTION

Consider the forms in (73):

	_____ #	in _____	like _____	
(73)a.	<i>nup</i>	<i>nuwe</i>	<i>nup ewə</i>	garden
b.	<i>miri</i>	<i>mire</i>	<i>miri ewə</i>	house, village
c.	<i>ki</i>	-----	<i>kewə</i>	that

The first column shows the unaffixed forms of these words. In the second column /-e/ is a locative which occurs following possessive suffixes and a few non-human nouns such as in the examples above. The particle /ewə/ 'like' is usually a separate word but in a few forms it is affixed because Spirantisation does not apply to the separate word forms, that is /nup ewə/ not */nuw ewə/. When these particles are added to words that end with /i/, that /i/ is deleted. One explanation for this process is that both /i/ and /e/ are front vowels. In other forms, that is /keya/ 'rain (emphatic)', /alayək/ 'only a friend', /bauya/ 'pig (emphatic)', different processes take place, for example y-Epenthesis. The following rule can be formulated to account for the above observations:

i-Deletion (i-D)

$$\begin{bmatrix} \text{v} \\ +\text{high} \\ -\text{back} \end{bmatrix} \rightarrow \emptyset / \text{---} + \begin{bmatrix} \text{v} \\ -\text{back} \\ -\text{low} \\ -\text{high} \end{bmatrix}$$

This rule states that /i/ is deleted when it occurs preceding /e/ across a morpheme boundary.

Note this does not apply across a word boundary.

6.9 CONSONANT DROP

There is an optional rule which may be dialectal where the final consonants of some kinds of words and clitics are dropped. Consider the forms in (74):

- | | | | | |
|--------|---------------|------------------|-----------------|------|
| | he___ | +customary | +relativiser | |
| (74)a. | <i>katsa</i> | <i>katsapma</i> | <i>katsaβi</i> | come |
| b. | <i>dzitsa</i> | <i>dzitsapma</i> | <i>dzitsaβi</i> | say |

The verb stems are /ka/ ‘come’ and /dzi/ ‘say’. The present tense is marked by /ts/ while /ma/ means ‘customary action’ and /i/ ‘determiner’ acts as a relativiser. The 3SG marker shows the alternation [-a~ap~-aβ]. The spirant is predicted by the Spirantisation rule (§3.2). The final consonant is deleted in word final position.

Optional Consonant Reduction (CD)

$$\begin{bmatrix} \text{C} \\ -\text{son} \end{bmatrix} \rightarrow \emptyset / \text{---}\#$$

This rule states that a stop consonant is deleted in word final position.

Note: This rule affects only a few morphemes: /-ap/ ‘3SG (present)’, /-ap/ ‘emphasis’ and /-gət/ ‘referential clitic’.

Examples of the latter two morphemes are as follows:

- | | | |
|-------------------------|-------------------------|------------------------|
| <i>munɛŋ-a</i> | a lie! | |
| <i>munɛŋ-aβ-e</i> | just a lie! | /e/ ‘angry determiner’ |
| <i>atsi-gə~atsi-gət</i> | of the man | |
| <i>atsi-gərəŋ</i> | at the place of the man | /ɛŋ/ ‘locative clitic’ |

6.10 TOPIC CLITIC

Consider the forms in (75):

- | | | | | |
|--------|----------------|----------------|------------------|--------|
| | Topic | Poss’d Topic | LOC Topic | |
| (75)a. | <i>ambinəŋ</i> | <i>ambigan</i> | <i>ambigərəŋ</i> | man |
| b. | <i>alanəŋ</i> | <i>alagan</i> | <i>alagərəŋ</i> | friend |

The noun roots here can be separated as /ambi/ ‘man’ and /ala/ ‘friend’. In the second column, /g/ can be separated as ‘2SG possessive’ and /gər/ in the third column is ‘locative’. The Topic markers then show the following alternatives: /nəŋ~an~ɛŋ/. There is another form

C → [α voice] / C _____
 [-sonorant] [α voice]

This rule states that a stop consonant agrees in voicing when it occurs following another consonant.

Condition: The rule does not apply where the form is reduplicated nor a compound, that is /kinkin/ 'the standing' see also /kin/ 'to stand', /təmunətəmun/ 'snail' see also /təmun/ 'shell'.

y-Epenthesis (y-E) [§3.4]

∅ → $\left[\begin{array}{l} \text{-syll} \\ \text{-cons} \\ \text{+high} \\ \text{-back} \end{array} \right]$ / V + _____ V
 [-High]

This rule states that a /y/ is inserted between two vowels across a morpheme boundary if the second vowel is not high.

Pronoun Nasal Assimilation (PNA) [§4.1]

C → [α point] / _____ + C
 [+nasal] [α point]
 [Topic/NOM Clitic]

This rule states that a nasal in the Nominaliser/Topic clitic becomes the same point of articulation as the stop it precedes across a morpheme boundary.

Spirantisation-1 (SP-1) [§4.2 and §5.2]

$\left[\begin{array}{l} \text{-cont} \\ \text{-cor} \\ \text{-ant} \\ \text{+voice} \end{array} \right]$ → [+cont] / V + _____ V
 [αF] [αF]
 [2nd singular]

This rule states that the velar voiced stop becomes the velar spirant when it occurs between like vowels and across a morpheme boundary.

Condition: This rule only applies to 2SG.

ə-Insertion (ə-I) (§5.1)

∅ → /ə/ / # C _____ + C
 C
 [OBJ Prefix]

This rule states that a /ə/ is inserted between two consonants when the first consonant is word initial or follows another consonant in the object prefix.

Vowel Harmony (VH) [§5.3]

$$\begin{array}{c} /ə/ \\ \text{[OBJ Prefix]} \end{array} \rightarrow \begin{array}{c} \text{[+High]} \\ \text{[αBack]} \end{array} / \text{---(C) + C} \begin{array}{c} \text{V} \\ \text{[+High]} \\ \text{[αBack]} \end{array}$$

This rule states that a /ə/ that is in the object prefix becomes High and agrees in Backness with a following high vowel. There may be one to two intervening consonants and there must be at least one, across the morpheme boundary, as the vowel /ə/ only occurs before consonants.

Object Nasal Insertion-1 (ONI) [§5.4]

$$\emptyset \rightarrow \begin{array}{c} \text{[+nas]} \\ \text{[-cor]} \\ \text{[-ant]} \end{array} / \text{V ---+} \begin{array}{c} \text{C} \\ \text{[-cor]} \\ \text{[-ant]} \end{array} \text{[1SG OBJ]}$$

This rule states that a velar nasal is inserted before a morpheme break in 1st singular object when the stem initial consonant is velar.

Object Degemination (ODG) [§5.5]

$$\begin{array}{c} \text{C} \\ \text{[αF]} \\ \text{[-singular]} \\ \text{[OBJ Prefix]} \end{array} \rightarrow \emptyset / \begin{array}{c} \text{C + ---} \\ \text{[αF]} \end{array}$$

This rule states that a consonant in the Object Prefix is deleted across a morpheme boundary when it follows a like consonant in nonsingular forms.

Glide Formation (GF) [§5.6]

$$\begin{array}{c} \text{V} \\ \text{[+High]} \end{array} \rightarrow \text{[-syll]} / \# \text{---V} \text{[-High]}$$

This rule states that a high vowel becomes a glide when it occurs word initially preceding a non-high vowel.

y-Deletion (y-D) [§5.7]

$$\begin{array}{c} \text{[+son]} \\ \text{[-syll]} \\ \text{[-cons]} \end{array} \rightarrow \emptyset / \text{C ---}$$

This rule states that a /y/ is deleted when it occurs following a consonant.

Future Nasal Assimilation (FNA) [§6.1]

$$\begin{bmatrix} C \\ +nasal \end{bmatrix} \rightarrow \begin{bmatrix} -cor \\ -ant \end{bmatrix} / \begin{bmatrix} C \\ +stop \\ -cor \\ -ant \end{bmatrix} + \underline{\quad}$$

[Future]

This rule states that a nasal that is future tense becomes a velar nasal following a velar stop across a morpheme boundary.

Nasal-Stop Rule (N-S) [§6.2]

$$\begin{bmatrix} C \\ +nasal \\ \alpha F \end{bmatrix} \rightarrow \begin{bmatrix} -nas \\ \alpha F \end{bmatrix} / \begin{bmatrix} 1st\ person \\ -singular \end{bmatrix}$$

[Future]

This rule states that the nasal in the future tense becomes a stop at the same point of articulation in 1st person, nonsingular forms.

Identical Sequence Drop (ISD) [§6.3]

$$C_1 V_1 \rightarrow \emptyset / C(V) \underline{\quad} C_1 V_1$$

This rule states that a CV sequence is deleted when it occurs preceding an identical sequence medially following a consonant and an optional vowel.

Condition: Sequence must be the result of some morphophonemic process as there are acceptable forms with identical syllables; that is /indzarere/ 'lazy', /dzidzibu/ 'type of mushroom'.

Stop Assimilation (SA) [§6.4]

$$\begin{bmatrix} C \\ -cont \\ +ant \\ -cor \end{bmatrix} \rightarrow \left\{ \begin{array}{l} [+cor] / \begin{bmatrix} [+cor] \\ +nasal \\ -cor \\ +ant \end{bmatrix} \\ [-ant] / \begin{bmatrix} -ant \\ -cor \end{bmatrix} \\ [+lateral] / \begin{bmatrix} C \\ +lateral \end{bmatrix} \end{array} \right. \underline{\quad}$$

[Same Subject]

This rule states that a labial stop in the Same Subject morpheme becomes an alveolar stop following an alveolar consonant or a nonlabial nasal. It becomes a velar following a velar stop consonant. It also becomes a lateral following a lateral consonant.

Stem m-Deletion (SmD) [§6.5]

$$\begin{bmatrix} +nas \\ +ant \\ -cor \end{bmatrix} \rightarrow \emptyset / \text{---} \left\{ \begin{bmatrix} v \\ c \\ -cor \\ +ant \end{bmatrix} \right\}$$

[Verb stem]

This rule states that the verb stem final /m/ is deleted in non-word final positions before a vowel or consonant that is not bilabial.

Habitual m-Deletion (HmD) [§6.6]

$$\begin{bmatrix} +nas \\ +ant \\ -cor \end{bmatrix} \rightarrow \emptyset / c + \text{---}$$

[Habitual]
[-Past]

This rule states that the /m/ in the habitual, non-past marker is deleted following a consonant.

Verbal Nasal Insertion (VNI) [§6.7]

$$\emptyset \rightarrow \begin{bmatrix} +nas \\ +ant \\ -cor \end{bmatrix} / \begin{bmatrix} +nas \\ -ant \\ -cor \end{bmatrix} + \text{---} v$$

[Verb stem]

This rule states that an alveolar nasal is inserted after a velar nasal in a verb stem before a vowel of a suffix across a morpheme boundary.

i-Deletion (i-D) [§6.8]

$$\begin{bmatrix} v \\ +high \\ -back \end{bmatrix} \rightarrow \emptyset / \text{---} + \begin{bmatrix} v \\ -back \\ -low \\ -high \end{bmatrix}$$

This rule states that a /i/ is deleted when it occurs preceding /e/ across a morpheme boundary.

Optional Consonant Deletion (CD) [§6.9]

$$\begin{bmatrix} c \\ -son \end{bmatrix} \rightarrow \emptyset / \text{---} \#$$

This rule states that a stop consonant is deleted in word final position.

Topic Rule (TP) [§6.10]

Topic →	{	/-nəŋ/ /	noun nonpers interr	+ _____
		/-ŋən/ /	pers pronoun demonstrative +NOM Clitic	+ _____
		/-an/ /	pers interr noun +possessive indef pronoun + 3s poss	+ _____
		/-eŋ/ /	noun +locative	+ _____

This rule states that the form /nəŋ/ occurs following a noun with no other clitics or a nonpersonal interrogative. While /ŋən/ occurs following personal pronoun or demonstrative with the Nominaliser Clitic or with a personal interrogative. The form /an/ occurs following a noun with a possessive suffix or adjectiviser or indefinite pronoun. And the form /eŋ/ occurs only following /gət/ 'locative'.

APPENDIX 3

Formulas and Affixes

1. Verbs

The formula stating the order of affix classes for the basic final verb in Burum-Mindik is as follows:

+object +verb stem +aspect +tense +person-number +mode

There are co-occurrence restrictions in the choice of verb affixes. For more information see Olkkonen and Olkkonen (1983). There are slightly different person-number sets for subject according to tense and object.

Object Prefix Person-Number Set

	SG	DU	PL
1	/n/	/nek/	/neŋg/
2	/g/	/ek/	/eŋg/
3	∅		
	[waŋ,y,∅]		

Subject Person Number Sets

With Present Tense

	SG	DU	PL
1	/al/	/it/	/in/
2	/an/	/ayot/	/e/
3	/ap/		

With Future Tense

	SG	DU	PL
1	/am/	/it/	/in/
2	/an/	/ayot/	/e/
3	/a/		

With Past Tense

	SG	DU	PL
1	/al/	/it/	/in/
2	/nəŋ/	/oyot/	/get/
3	/ək/		

With Irrealis Aspect

	SG	DU	PL
1	/ileŋ/	/it/	/in/
2	/an/	/ayot/	/e/
3	/ap/		

The medial verb with Different Subject marker has this set of Person Number markers:

	SG	DU	PL
1	/al/	/tsi/	/in/
2	/nəŋ/	/oyot/	/get/
3	/i/		

2. Non-verbs

See Appendix 3, §3 Pronoun Processes for sets of pronoun roots and other clitics that occur with pronouns. Here I will show some representative sets of non-verb markers.

Nominative pronouns are Class I roots with determiner clitic which is deleted in word medial positions.

	SG	DU	PL
1	/ni/	/niri/	/nini/
2	/gi/	/ŋjiri/	/ŋjini/
3	/i/		

Possessive Suffix for nouns

	SG	DU	PL
1	/-ni/	/-niri/	/-nini/
2	/-gi/	/-ŋjiri/	/-ŋjini/
3	/-ŋi/		

Class 1 Pronoun Roots

	SG	DU	PL
1	/n-/	/nir-/	/nin-/
2	/g-/	/ŋjir-/	/ŋjin-/
3	/ŋ/		

Class 2 Pronoun Roots

	SG	DU	PL
1	/n-/	/n-/	/n-/
2	/g-/	/y/	∅
3	/y-/		

3. Other clitics and suffixes

There are other suffixes and clitics which occur on verbs and nouns in Burum-Mindik. I will simply list them. For more information and restrictions see Olkkonen and Olkkonen (1983) and S. Olkkonen (1986).

-eŋ	locative	-ap	emphasis
-buk	with	-təp	a little
-ək	only/from	-(nəŋ)	Topic clitic
-i	determiner/relativiser	-e	locative/angry emphatic
-i/u(hi/hu)	verbaliser	-ŋi	adjectiviser
-m	infinitive	-gu	sequence emphasiser
ewə	like	gərəken	toward
dop	analogous	-mə	adversative
-n	'reference to me' occurs with certain locative nouns		
-k	'reference to you' occurs with certain locative nouns		
nan-	'self', prefix on Class I pronoun roots		
-gət	possessor/verbaliser/purpose/referential clitic		

Verbal Paradigms

Present

	come	go up	see	scatter
1SG	katsal	kotsal	ektsal	deŋdzal
2SG	katsan	kotsan	ektsan	deŋdzan
3SG	katsa	kotsa	ektsa	deŋdza
1DU	katsit	kotsit	ektsit	deŋdzit
2/3DU	katsayot	kotsayot	ektsayot	deŋdzayot
1PL	katsin	kotsin	ektsin	deŋdzin
2/3PL	katse	kotse	ektse	deŋdze

Future

1SG	kamam	kotmam	ekŋam	deŋmam
2SG	kaman	kotman	ekŋan	deŋman
3SG	kama	kotma	ekŋa	deŋma
1DU	kabit	kotpit	ekit	deŋbit
2/3DU	kamayot	kotmayot	ekŋayot	deŋmayot
1PL	kabin	kotpin	ekin	deŋbin
2/3PL	kame	kotme	ekŋe	deŋme

Past

1SG	kayal	koral	eŋal	deŋnal
2SG	kanəŋ	kotnəŋ	eknəŋ	deŋnəŋ
3SG	kayək	korək	eŋək	deŋnək
1DU	kait	korit	eŋit	deŋnit
2/3DU	kayayot	koroyot	eŋot	deŋŋoyot
1PL	kain	korin	eŋin	deŋnin
2/3PL	kaget	kotket	eket	deŋget

Different Subject Medial verb

1SG	<i>kayalga</i>	<i>koralgā</i>	<i>eyalga</i>	<i>deŋnalga</i>
2SG	<i>kanəŋga</i>	<i>kotnəŋga</i>	<i>eknəŋga</i>	<i>deŋnəŋga</i>
3SG	<i>kaiga</i>	<i>koriga</i>	<i>eyiga</i>	<i>deŋniga</i>
1DU	<i>katsiga</i>	<i>kotsiga</i>	<i>ektsiga</i>	<i>deŋdziga</i>
2/3DU	<i>kayoyotka</i>	<i>koroyotka</i>	<i>eyotka</i>	<i>deŋnoyotka</i>
1PL	<i>kainga</i>	<i>koringa</i>	<i>eyinga</i>	<i>deŋninga</i>
2/3PL	<i>kagetka</i>	<i>kotketka</i>	<i>eketka</i>	<i>deŋgetka</i>

Same Subject Medial Verbs

	<i>kaba</i>	<i>kota</i>	<i>eka</i>	<i>deŋda</i>
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Infinitive

	<i>kam</i>	<i>kot</i>	<i>ek</i>	<i>deŋ</i>
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Habitual Present

1SG	<i>kamaktsal</i>	<i>koraktsal</i>	<i>eyaktsal</i>	<i>deŋaktsal</i>
2SG	<i>kamaktsan</i>	<i>koraktsan</i>	<i>eyaktsan</i>	<i>deŋaktsan</i>
3SG	<i>kamaktsa</i>	<i>koraktsa</i>	<i>eyaktsa</i>	<i>deŋaktsa</i>
1DU	<i>kamaktsit</i>	<i>koraktsit</i>	<i>eyaktsit</i>	<i>deŋaktsit</i>
2/3DU	<i>kamaktsayot</i>	<i>koraktsayot</i>	<i>eyaktsayot</i>	<i>deŋaktsayot</i>
1PL	<i>kamaktsin</i>	<i>koraktsin</i>	<i>eyaktsin</i>	<i>deŋaktsin</i>
2/3PL	<i>kamaktse</i>	<i>koraktse</i>	<i>eyaktse</i>	<i>deŋaktse</i>

Habitual Future

1SG	<i>kamakŋam</i>	<i>korakŋam</i>	<i>eyakŋam</i>	<i>deŋakŋam</i>
2SG	<i>kamakŋan</i>	<i>korakŋan</i>	<i>eyakŋan</i>	<i>deŋakŋan</i>
3SG	<i>kamakŋa</i>	<i>korakŋa</i>	<i>eyakŋa</i>	<i>deŋakŋa</i>
1DU	<i>kamakit</i>	<i>korakit</i>	<i>eyakit</i>	<i>deŋakit</i>
2/3DU	<i>kamakŋayot</i>	<i>korakŋayot</i>	<i>eyakŋayot</i>	<i>deŋakŋayot</i>
1PL	<i>kamakin</i>	<i>korakin</i>	<i>eyakin</i>	<i>deŋakin</i>
2/3PL	<i>kamakŋe</i>	<i>korakŋe</i>	<i>eyakŋe</i>	<i>deŋakŋe</i>

Habitual Past

1SG	<i>kamalal</i>	<i>kotmalal</i>	<i>etmalal</i>	<i>deŋmalal</i>
2SG	<i>kamalnəŋ</i>	<i>kotmalnəŋ</i>	<i>etmalnəŋ</i>	<i>deŋmalnəŋ</i>
3SG	<i>kamalək</i>	<i>kotmalək</i>	<i>etmalək</i>	<i>deŋmalək</i>
1DU	<i>kamalit</i>	<i>kotmalit</i>	<i>etmalit</i>	<i>deŋmalit</i>
2/3DU	<i>kamaloyot</i>	<i>kotmaloyot</i>	<i>etmaloyot</i>	<i>deŋmaloyot</i>
1PL	<i>kamalin</i>	<i>kotmalin</i>	<i>etmalin</i>	<i>deŋmalin</i>
2/3PL	<i>kamale</i>	<i>kotmale</i>	<i>etmale</i>	<i>deŋmale</i>

Irrealis

1SG	<i>kabiləŋ</i>	<i>kotpiləŋ</i>	<i>etpiləŋ</i>	<i>deŋbiləŋ</i>
2SG	<i>kaban</i>	<i>kotpan</i>	<i>etpan</i>	<i>deŋban</i>
3SG	<i>kabap</i>	<i>kotpap</i>	<i>etpap</i>	<i>deŋbap</i>
1DU	<i>kabit</i>	<i>kotpit</i>	<i>etpit</i>	<i>deŋbit</i>
2/3DU	<i>kabayot</i>	<i>kotpayot</i>	<i>etpayot</i>	<i>deŋbayot</i>
1PL	<i>kabin</i>	<i>kotpin</i>	<i>etpin</i>	<i>deŋbin</i>
2/3PL	<i>kabe</i>	<i>kotpe</i>	<i>etpe</i>	<i>deŋbe</i>

Object Prefixing Verbs (all 3SG future Subject)

	call	bite	leave	see
1SG	<i>noʔolma</i>	<i>nəyəma</i>	<i>nəmosotma</i>	<i>nekma</i>
2SG	<i>goyolma</i>	<i>gəyəma</i>	<i>gəmosotma</i>	<i>gekma</i>
3SG	<i>oʔolma</i>	<i>yəyəma</i>	<i>mosotma</i>	<i>ekma</i>
1DU	<i>nekoyolma</i>	<i>nekəyəma</i>	<i>nekəmosotman</i>	<i>eekma</i>
2/3DU	<i>ekoyolma</i>	<i>ekəyəma</i>	<i>ekəmosotma</i>	<i>eekma</i>
1PL	<i>neŋgoyolma</i>	<i>neŋgəyəma</i>	<i>neŋgəmosotman</i>	<i>eŋgekma</i>
2/3PL	<i>eŋgoyolma</i>	<i>eŋgəyəma</i>	<i>eŋgəmosotma</i>	<i>eŋgekma</i>

	hit	give	take
1SG	<i>nuŋguma</i>	<i>niŋgima</i>	<i>nuanŋitma</i>
2SG	<i>guʔuma</i>	<i>giyima</i>	<i>guanŋitma</i>
3SG	<i>kwetma</i>	<i>wanŋima</i>	<i>wanŋitma</i>
1DU	<i>nekuma</i>	<i>nekima</i>	<i>nekuanŋitma</i>
2/3DU	<i>ekuma</i>	<i>ekima</i>	<i>ekuanŋitma</i>
1PL	<i>neŋguma</i>	<i>neŋgima</i>	<i>neŋguanŋitma</i>
2/3PL	<i>eŋguma</i>	<i>eŋgima</i>	<i>eŋguanŋitma</i>

Noun Paradigms

Possessive

	flesh	blood	sister	yam	tooth	grease
1SG	<i>busuni</i>	<i>sepni</i>	<i>neni</i>	<i>koŋni</i>	<i>dzitni</i>	<i>keləkni</i>
2SG	<i>busugi</i>	<i>sepki</i>	<i>nengi</i>	<i>koŋgi</i>	<i>dzitki</i>	<i>keləki</i>
3SG	<i>busuŋi</i>	<i>sepŋi</i>	<i>nenŋi</i>	<i>koŋi</i>	<i>dzitŋi</i>	<i>keləŋi</i>
1DU	<i>busuniri</i>	<i>sepniri</i>	<i>neniri</i>	<i>koŋniri</i>	<i>dzitniri</i>	<i>keləkniri</i>
2/3DU	<i>busuŋiri</i>	<i>sepŋiri</i>	<i>nenŋiri</i>	<i>koŋiri</i>	<i>dzitŋiri</i>	<i>keləŋiri</i>
1PL	<i>busunini</i>	<i>sepnini</i>	<i>nenini</i>	<i>koŋnini</i>	<i>dzitnini</i>	<i>keləknini</i>
2/3PL	<i>busuŋini</i>	<i>sepŋini</i>	<i>nenŋini</i>	<i>koŋini</i>	<i>dzitŋini</i>	<i>keləŋini</i>

	with__	about__	a little__	really__	
	<i>busubuk</i>	<i>busugə</i>	<i>busutəp</i>	<i>busuyap</i>	flesh
	<i>sepuk</i>	<i>sepəkə</i>	<i>septəp</i>	<i>sewap</i>	blood
	<i>nenbuk</i>	<i>nengə</i>	<i>nendəp</i>	<i>nenap</i>	sister
	<i>koŋbuk</i>	<i>koŋgə</i>	<i>koŋdəp</i>	<i>koŋap</i>	yam
	<i>dzitpuk</i>	<i>dzitkə</i>	<i>dzitəp</i>	<i>dzirap</i>	tooth
	<i>keləkuk</i>	<i>keləkə</i>	<i>keləktəp</i>	<i>keləyap</i>	grease

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