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ABSTRACT

This paper presents a synoptic account of verbal suffixation in the Ura dialect of Bumthang, a language of central Bhutan. Examining verbal allomorphy shows the persistence of exceptions to historical sound changes in contemporary allophonic and allomorphic processes, and reveals striking contrasts with the culturally dominant Tibetic languages of the area. We examine the ways in which some of the allomorphy is motivated by patterns seen in the phonology of the language more widely, while some of the changes reflect purely (arbitrary) morphophonological processes.

KEYWORDS

verbal inflection, morphophonology, rule ordering, irregular sound change

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The segmental inflection of Bumthang verbs: Exploring the boundary between phonology and morphophonology[†]

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1 Background

Bumthang is a language of north-central Bhutan; it has been described as being an East Bodish language closely related to Kurtöp (Hyslop 2017) and Khengkha (Yangzom and Arkesteijn 1996, Chamberlain 2004, and Ikeda 2021), primarily on the basis of lexical similarities and sound changes (Michailovsky and Mazaudon 1994, DeLancey 2008, Hyslop 2013; the sound changes are imperfectly shared, according to our data).[1] Despite the immediately apparent lexical similarities (see, e.g., Michailovsky and Mazaudon 1994, Hyslop 2013), and the many similarities in case marking (similarities which extend beyond Bhutan), the verbal systems of the languages are quite different, and the phonological systems, particularly the tone systems, are equally distinct. In all of the languages verbs inflect for a number of categories by suffix, with a number of morphophonological changes arising in the interaction of root phonology and suffix form. In this article we only examine segmental phonology; the complex suprasegmental system does not affect the segmental allomorphy described here, and is only discussed once with respect to the personal perfective suffix. The main object of discussion is a graded presentation of the segmentally complex data on verbal inflection from the Ura variety of Bumthang, and the implications these data have for the phonological analysis of the language. Other work on Bumthang can be found in van Driem (2015), and more recently Donohue and Donohue (2016, 2019), Peck (2017), Peck, Wyatt, and Donohue (2020), Wyatt (2017), Dzongkha Development Commission (2018), and Donohue (2020). Comparative data from Dzongkha and (written) Tibetan will be drawn upon, though these two languages are both Tibetic, which forms a sister to the East Bodish clade that contains Bumthang.

2 Verbal paradigms

Prior to the data on verb inflection, a few notes on phonology and orthography are needed. The contrastive onsets are: *pʰ p b tʰ t d tsʰ ts tʃʰ tʃ dʒ kʰ k g m n ɲ ŋ s z ʂ h r l l̥ w j*; complex onsets include

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[1] For example, the change Proto-Tibeto-Burman **l > j* (Matisoff 2003) is proposed as a shared innovation for the 'core' languages Khengkha-Bumthang-Kurtöp, but this is not consistently attested, as discussed in 2.4.

phr pr br pʰl pl bl ʈʰɻ ʈɻ ɖɻ kʰr kr gr (*kʰl*) *kl gl kʰw kw gw mr ml ŋr dw tʃʰw*. A wide range of allophony is found with the palato-alveolar affricates, and with the rhotic (the rhotic varies between tap and approximant in onset clusters, except in clusters with coronals, in which case it is invariably an approximant, and the obstruent is realised as retroflex with a non-grooved fricative release); the coronal stops are dental. Lexemes are maximally CCVC in structure. Compared to the phonological contrasts present in onsets, only a restricted range of codas are found in Bumthang: only underlying *-p*, *-t*, *-k*, *-s*, *-m*, *-n*, *-ŋ*, *-r*, *-l*, *-j*, and *-w* can close a syllable in Bumthang; no verb roots have been found with a final *-s* or a final *-w*, leaving nine possible codas on verbs.[2] Voiced symbols for plosives are contrastive, unlike the case in many other languages of the Himalayas (Donohue 2018). The seven vowels are *i e ɛ a ɔ o u*, though *o* is almost entirely restricted to bound suffixes, and *e* is significantly less frequent than the other vowels (only two stems, *mot* 'not exist' and *go* 'wheat', are known to contain the *o* vowel, and *e* occurs at less than 10% of the rate of any other vowel). A number of diphthongs are found, which do not cooccur with non-vocalic codas (thus prohibiting *(C)VGC); the difference between (for instance) V*i* and V*j* is not categorial. Vowel height harmony applies to the non-low vowels in a non-categorial sense, though *a* is outside the system.[3] Further phonological details will be presented in the following sections as they become relevant to the discussion of verbal inflection. The following sections will examine the allomorphy found when the major affixal inflections are added to vowel-final verbs (3.1), nasal-final verbs (3.2), plosive-final verbs (3.3), and finally liquid or glide-final verbs (3.4), with our analysis being refined as each tranche of new data is examined.

2.1 Vowel-final verbs

All known verbs in Bumthang are monosyllabic.[4] When there is no coda on a syllable, there is only a small amount of variation in the forms of the morphemes or the roots. A range of verbs showing different inflections is given in Table 1; here, and in subsequent tables, morpheme boundaries are not indicated, but can easily be understood by comparing the form in row I, which is segmentally identical to the root, with the forms in the sub. On the basis of the data in Table 1, we can assign the forms in the I row as segmentally equal to the roots of the verbs, and the five suffixes *-saŋ*, *-za*, *-na*, *-s* and *-mɔ* as the underlying forms of the II, III, IV, V, and VI rows, respectively (asserting that the impersonal irrealis has no segmental form in its inflection). The infinitive and sequential present complications, with the vowel height of the affix varying depending on the final vowel in the verb root, as summarised in (1). Following a discussion of this variation, the different forms of the imperative require further analysis.

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[2] Examples of *-s* final words which are not verbs include: *mras* 'paddy rice', *nis* 'seven', *dʒes* 'footprint', *dʒas* 'gate', *kas* 'steps, ladder', *ŋas* 'pillow', *nas* 'black barley', *was* 'honey', *buras* 'silk', and *pɛs* 'onion' (< Hindi/Nepali *pjāz*). (Many of these are *-t* final in other Bumthang dialects; see Donohue (2020).) Examples of *-w* final words which are not verbs include *tau* 'pot', *mau* 'down', *yau* 'up' (many more examples of syllable-final, but word-internal, *-w* can be found); these diphthongs are realised as [əw]. With *krao* 'unripe', *dʒao* 'facial hair', and *ao* 'where' the diphthongs are realised as [aw]. Beginning in 2.1 we will see that *-s* can be a coda on a verb, as a result of inflection.

[3] More details of the segmental and suprasegmental phonology can be found in Donohue and Peck (forthcoming).

[4] A large number of predicates involve more than a single syllable, but in those cases the non-inflecting syllable is demonstrably nominal, such as *sem ra* [heart come] 'think about'.

	‘pick’	‘uncover’	‘die’	‘see’	‘load’	‘melt’
	i	*e*	*ɛ*	*a*	*ɔ*	*u*
I	*si*	*ɕe*	*sɛ*	*tsʰa*	*sɔ*	*ʂʵu*
II	*sisaŋ*	*ɕesaŋ*	*sɛsaŋ*	*tsʰasaŋ*	*sɔsaŋ*	*ʂʵusaŋ*
III	*siza*	*ɕeza*	*sɛza*	*tsʰaza*	*sɔza*	*ʂʵuza*
IV	*sina*	*ɕena*	*sɛna*	*tsʰəna*	*sɔna*	*ʂʵuna*
V	*sis*	*ɕes*	*sɛs*	*tsʰas*	*sɔs*	*ʂʵus*
VI	*simɔ*	*ɕemɔ*	*sɛmɔ*	*tsʰamɔ*	*sɔmɔ*	*ʂʵumɔ*
VII	*siru*	*ɕero*	*sɛrɔ*	*tsʰarɔ*	*sɔrɔ*	*ʂʵuru*
VIII	*sizi*	*ɕeze*	*sɛzɛ*	*tsʰazɛ*	*sɔzɛ*	*ʂʵuzi*
IX	*sijɛ*	*ɕe ~ ɕje*	*sɛ ~ sjɛ*	*tsʰaj*	*swɛ*	*ʂʵwɛ*

Table 1. Inflections of vowel-final verbs[5]

I	impersonal irrealis
II	personal irrealis
III	incompletive
IV	impersonal perfective
V	personal perfective
VI	consequential
VII	infinitive
VIII	sequential
IX	imperative

Table 2. Affixal verbal categories

(1) a. **Variation in vowels with the infinitive (VII)**

Affix: [u] If the final vowel of the root is *i* or *u*

Affix: [ɔ] If the final vowel of the root is *ɛ*, *a*, or *ɔ*

Affix: [o] If the final vowel of the root is *e*

[5] The fricatives [ɕ] and [ʂʵ] (as well as [ʃ]) are allophones of the same consonant, conditioned by the following vowel.

b. **Variation in vowels with the sequential (VIII)**

Affix:	[i]	If the final vowel of the root is *i* or *u*
Affix:	[e]	If the final vowel of the root is *ɛ*, *a*, or *ɔ*
Affix:	[ɛ]	If the final vowel of the root is *e*

Given the data summarised in (1), we can posit an underlying /o/ for the vowel of the infinitive suffix, with the vowel raising to [u] following a high vowel in the preceding syllable, and lowering to [ɔ] when a lower vowel precedes, and an underlying /e/ for the sequential with similar height variation. Alternative analyses, with underlying low-mid vowels /ɔ/ and /ɛ/, are not plausible. If we were to posit an underlying /ɔ/ in the infinitive suffix we would have to assert a special vowel height harmony for this suffix, since we can see, from the consequential in row VI, that /ɔ/ can be invariant, regardless of the height of the vowel in the verb root. We might suppose that the vowel is underlyingly high, but data from nominal compounds argues against that. In (2) we have examples of compounds with 'field' and 'flour' for three crops. The data shows that the vowel of *pʰi* 'flour' does not vary in the compounds, regardless of the height of the vowel in the first element of the compound. On the other hand the vowel of *leŋ* 'field' lowers after a low or low-mid vowel, and raises after a high vowel. This suggests that it is the (lexically rare) upper mid vowels, *e* and *o*, that undergo vowel height harmony, hence the assignment of these vowels to the infinitive and sequential.

(2)	*brasma* 'buckwheat'	*go* 'wheat'	*ki* 'potato'
leŋ 'field'	*brasmalɛŋ*	*goleŋ*	*kiliŋ*
pʰi 'flour'	*brasmapʰi*	*gopʰi*	*kipʰi*

The data in Table 1 show no alternation in the consonant associated with this suffix, and so on the basis of the data seen so far we posit the underlying form *-ro* for the infinitive, and *-ze* for the sequential.

Vowel harmony can be motivated, stochastically, in the lexicon more widely. As mentioned earlier, the high mid vowels are very rare in lexical roots; *o* only occurs in two monosyllables, and *e* is rare. In disyllabic words the only vowel that can follow *e* is the low vowel *a*, which appears to be outside the system of vowel height harmony, as we shall see. The remaining five vowels show very skewed patterns of cooccurrence amongst the non-low vowels. Table 3 shows the results of a survey of 548 disyllabic roots in Bumthang, excluding reduplicants, ideophones, clear loans, and proper names (many of which are loans from Dzongkha or Tibetan). The left side of the table shows the raw numbers of words with a particular combination of vowels. (For instance, there are two words, *duŋtsɔ* 'traditional healer' and *rupɔt* 'vegetables', with the *u-ɔ* pattern.) It is clear that the low vowel is the most common vowel in all rows and columns, and that there are very different distributions of cooccurrence amongst the non-low vowels; for instance, there are twice as many *ɛ-ɛ* combinations as there are *ɛ-i* words, and we can generally see a pattern of high vowels occurring with high vowels, and mid vowels with mid vowels. The right side of Table 3 shows the level of skewing of the numbers in each cell from the left side of the table; the numbers represent the proportion of attested numbers to expected numbers. Those cells with higher-than-expected numbers are shaded, and those with lower-than-expected numbers are shown in smaller font. In all cases the preferred non-low vowel to cooccur with another non-low vowel shares the same height.

	Raw numbers						Skewedness				
	i	*ɛ*	*a*	*ɔ*	*u*		*i*	*ɛ*	*a*	*ɔ*	*u*
i	15	0	44	3	15	*i*	1.6	0	1.1	0.3	1.4
ɛ	1	8	41	22	0	*ɛ*	0.1	1.4	1.1	2.1	0
a	33	17	126	30	34	*a*	1.1	0.9	1.0	0.9	1.0
ɔ	2	15	51	23	1	*ɔ*	0.2	2.1	1.1	1.7	0.1
u	13	1	29	2	22	*u*	1.6	0.2	0.8	0.2	2.4

Table 3. Cooccurrence of vowels in (C)(C)V(C)(C)V(C) roots

We notice that the low vowel /a/ is realised as a schwa when the root is followed by the impersonal perfective suffix *-na*. In contrast to the patterns seen with the infinitive, the variation in height induced by the impersonal perfective represents a form of vowel height dissimilation peculiar to this one suffix.[6]

The imperative presents a complex story. The suffix varies between *-j*, *-ɛ*, and *-e*, depending on the quality of the preceding vowel, described in (3).

(3) **Variation in vowels with the imperative**

Affix:	[j]	If the final vowel of the root is low (*a*)
Affix:	[e]	If the final vowel of the root is *e* (plus degemination)
Affix:	[ɛ]	If the final vowel of the root is *i*, *ɛ*, *ɔ*, or *u*
Root:	[w]	If the root-final vowel is *ɔ* or *u*

As well as the affix showing variation, and we see glide formation following non-low vowels, and the loss of a rounded vowel preceding this glide. The motivation for glide formation might be to avoid VV sequences, which are not attested in the language (other than, arguably, diphthongs). The only known VV sequences that do not automatically involve diphthongisation (that is, which are realised across two syllables) are the words *dʒɔadʒɔa* 'fast', and *atɕʰiu* 'sneeze' and *tɕiutɕiu* 'chick (bird)'. The first of these is almost always realised with a glottal stop, [dʒɔʔadʒɔʔa], and the other two are transparently sound-symbolic, and are regularly realised without tautosyllabic high vowels: [a.tɕhi.u] ~ [a.tɕhiw]. The different behaviour of the front glide and the back glide reflect different their different distribution in monomorphemic forms in the lexicon, in that sequences of the form V*wa* are found, but there are (almost) no attested words with V*wi*, V*we*, V*wɛ*, V*wɔ*, or V*wu* sequences. The V*wa* sequences (almost) all appear to involve an earlier, and no longer productive, nominalising suffix (*-pa/-ma/-wa*).

[6] While idiosyncrative, the raising of *a* to *ə* could be seen as an instance of Non-High Vowel Raising, described in (5).

(4) **Glide conversion with the imperative**

Glide: [j]	If the final vowel of the root is *i*
Glide: [j ~ Ø]	If the final vowel of the root is *e* or *ɛ* (optional glide)*
Glide: [w]	If the final vowel of the root is *ɔ* or *u*
No glide	If the final vowel of the root is *a*

* This can be thought of as the optional loss of a non-high front vowel preceding the suffix.

These data suggest that the imperative suffix is underlyingly -*ɛ*. This front mid vowel is raised to a high front glide following a low vowel, and shows height harmony with an /e/ in the root; otherwise it surfaces as a [ɛ]. The different changes that apply can be listed individually as shown in (5), not in any particular order, though in practice they interact. The first change governs the optionality of glide formation following *e* or *ɛ*; the second change concerns glide formation for non-low vowels, and the third eliminates any remaining VV sequences.[7] Examples of how these different processes apply to the different verbs introduced in Table 1 are given in Table 4.

(5) **Changes attested with the imperative**

Non-High Vowel Raising (NHVR)

1. $\varepsilon \quad \rightarrow e \,/\, e\_\_$

$\qquad \rightarrow j \,/\, a\_\_$

Degemination (Dgem) (optional process)

2. $(V_\alpha V_\alpha \rightarrow V_\alpha)$

Glide formation (GF)

3. $V_{[-\text{low},\, \alpha\text{ round}]}V \rightarrow G_{[\alpha\text{ round}]}V \,/\, [-\text{high}]$

$\qquad \rightarrow VG_{[\alpha\text{ round}]}V \,/\, [+\text{high}]$

*w*V avoidance (**w*V)

4. $V_{[+\text{round}]}GV \rightarrow GV$

[7] A constraint-based approach would refer to constraints such as *VV (degemination), GG/σ (avoid two glides in the same syllable), *V[–low]G (avoid glides without a low vowel), **j*V[+low] (avoid [ja] sequences), as well as Max and Dep constraints.

	‘pick’	‘uncover’	‘die’	‘see’	‘load’	‘melt’	
I	*si*	*ɕe*	*sɛ*	*tsʰa*	*sɔ*	*ʂˡu*	
	+ *ɛ*	+ *ɛ*	+ *ɛ*	+ *ɛ*	+ *ɛ*	+ *ɛ*	
	siɛ	*ɕeɛ*	*sɛɛ*	*tsʰaɛ*	*sɔɛ*	*ʂˡuɛ*	
1	*siɛ*	*ɕe**e***	*sɛɛ*	*tsʰa**j***	*sɔɛ*	*ʂˡuɛ*	NHVR
2	*siɛ*	*ɕee* ~ ***ɕe***	*sɛɛ* ~ ***sɛ***	*tsʰaj*	*sɔɛ*	*ʂˡuɛ*	(Dgem)
3	*si**j**ɛ*	*ɕ**j**e* ~ *ɕe*	*s**j**ɛ* ~ *sɛ*	*tsʰaj*	*s**w**ɛ*	*ʂˡu**w**ɛ*	GF
4	*sijɛ*	*ɕje* ~ *ɕe*	*sjɛ* ~ *sɛ*	*tsʰaj*	*s**w**ɛ*	*ʂˡ**w**ɛ*	**w*V

Table 4. Comparing underlying forms and surface realisations

As a side note, it is striking that this process of glide formation allows CCC onsets to appear in the language; outside imperatives, onsets are limited to a consonant followed by at most one of *r*, *l*, or *w*. A verb with a syllable shape C[*r*/*l*][*ɔ*/*u*], such as *kʰrɔ* ‘wash’, forms its imperative as *kʰrwɛ*; conversely, triconsonantal clusters are not attested in the imperative of words like *gre* ‘ask’, for which the imperative is only ever *gre*, and never **grje*, showing that CCC onsets are only marginally acceptable in the system, and when the imperative allows a variant without a glide, then that variant is used with a root containing a complex onset to avoid creating a CCC onset.

Based on the analysis so far, we can posit interim forms of the suffixes as shown in Table 5.

I	impersonal irrealis	*Ø*
II	personal irrealis	*-saŋ*
III	incompletive	*-za*
IV	impersonal perfective	*-na*
V	personal perfective	*-s*
VI	consequential	*-mɔ*
VII	infinitive	*-ro*
VIII	sequential	*-ze*
IX	imperative	*-ɛ*

Table 5. Affixal verbal categories based on vowel-final verbs

The forms posited in Table 5 will be revised in the following sections.

2.2 Nasal-final verbs

When we examine nasal-final roots, we find that we must revise our account somewhat. Table 6 shows representative forms. While forms I, II, III, IV and VI are unchanged from those expected given the generalisations of the previous section, there is no segmental realisation of the personal perfective in V, so that the forms for rows I and V in Table 6 are identical. The consequential in row VI remains invariant, and is in some cases identical segmentally to the infinitive in row VII, which is realised solely with a final vowel. The vowel height of this final vowel is predicted on the basis of the same summary seen in (1), and this is true of the sequential in VIII as well. The imperative is most different from the forms seen in Table 1, being consistently realised as *-aj* when it follows labial or dorsal nasals, and *-laj* following a coronal nasal.

	'break'	'chop down'	'fill'	'wear (on head)'	'stand'	'wake up.TR'
	–m	*–m*	*–n*	*–n*	*–ŋ*	*–ŋ*
I	*ʈʰɻɔm*	*tʰim*	*nan*	*nun*	*jaŋ*	*kruŋ*
II	*ʈʰɻɔmsaŋ*	*tʰimsaŋ*	*nansaŋ*	*nunsaŋ*	*jaŋsaŋ*	*kruŋsaŋ*
III	*ʈʰɻɔmza*	*tʰimza*	*nanza*	*nunza*	*jaŋza*	*kruŋza*
IV	*ʈʰɻɔmna*	*tʰimna*	*nəna*	*nuna*	*jəŋna*	*kruŋna*
V	*ʈʰɻɔm*	*tʰim*	*nan*	*nun*	*jaŋ*	*kruŋ*
VI	*ʈʰɻɔmɔ*	*tʰimɔ*	*nanmɔ*	*nunmɔ*	*jaŋmɔ*	*kruŋmɔ*
VII	*ʈʰɻɔmdɔ*	*tʰimdu*	*nandɔ*	*nundu*	*jaŋɔ*	*kruŋu*
VIII	*ʈʰɻɔmzɛ*	*tʰimzi*	*nanzɛ*	*nunzi*	*jaŋzɛ*	*kruŋzi*
IX	*ʈʰɻɔmaj*	*tʰimaj*	*nanlaj*	*nunlaj*	*jaŋaj*	*kruŋaj*

Table 6. Inflections of nasal-final verbs

The absence of any segmental trace of the personal perfective, row V, earlier seen as involving the segmental suffix *-s*, can be accounted for by appealing to a language-wide constraint against complex codas (no words allow complex codas of any sort), as in (6).[8]

(6) ***ComplexCoda**

Avoid complex codas

When the monoconsonantal suffix *-s* is added to a syllable with a pre-existing coda, it is not possible for both to be realised. Given the competition between the coda associated with the root and the monoconsonantal suffix, the suffix is lost.[9]

(7) *nan* + *-s* → *nans* → *nan*, **nas*

In the infinitive, shown in row VII, and the sequential, in VIII, we see the same vowel height alternations that were seen in Table 1. We do not, however, see the rhotic that was present in the infinitive forms in Table 1. There are two obvious ways to reconcile these facts: in the first, the rhotic is present underlyingly, and, following a dispreference for an ambisyllabic nasal + liquid sequence, an underlying *ro* is reduced to *o* with an *ŋ*-final verb, and to *do* following another nasal (*m* or *n*). In the second possibility the suffix underlyingly contains the stop *d*, and displays intervocalic lenition (in

[8] One exception can be seen in the recent loan in (31c).

[9] The personal perfective is also associated with a H tone. This H tone is preserved even when the fricative is lost, forming a complex contour when combined with the tone of the verb root. Note that van Driem's (2015) description explicitly allows complex codas, citing *tups* 'cut', which is not attested in our data.

Table 1). Under either analysis, the complete loss of the consonant following a velar nasal is not predicted.

(8)	a.	Infinitive	*-ro*	→	*ro*	/ V__
				→	*do*	/ *m*, *n*__
				→	*o*	/ *ŋ*__
	b.	Infinitive	*-do*	→	*ro*	/ V__
				→	*do*	/ *m*, *n*__
				→	*o*	/ *ŋ*__

We do find words with an ambisyllabic nasal-liquid sequence, shown in (9), as well as nasal-liquid clusters in onsets, seen in (10), though none of these involve the coronal nasal *n*.[10] Ambisyllabic nasal-*d* sequences are found for all three nasals, and the frequency of *ŋ.d* sequences is not lower than *md* sequences, as seen in (11–13). There is thus no strong phonological reason, given that the infinitive of *ʈʰɻɔm* 'break' is *ʈʰɻɔmdɔ*, that the infinitive of *jaŋ* 'stand' could not be **jaŋdɔ*; it is, nonetheless, *jaŋɔ*.

(9) **Ambisyllabic nasal + liquid sequences**

dum.rej	'garden'	*ŋaŋ.riŋ*	'deliberate'
		gaŋ.ri	'large mountain'
kʰamra	'room'		
ʂᶩɔmleŋ	'bowline'	*taŋlup*	'container'
		daŋlup	'plate'
		ɕitaŋla	'marten'

(10) **Nasal + liquid complex onsets**

mras	'paddy rice'	*ŋraŋ*	'drunk'
mraj	'scratch'		
mlak	'churned up'		

(11) **Ambisyllabic *m* + *d* sequences**

namdɔ	'recollection'
zɔmdu	'village meeting'

[10] Additional examples can be found in recent loan words: *am.ri.ka* 'America' (< English), *ɲin.lam* 'day's travel' (< Dzongkha).

bumdaŋ	'Bumthang'

(12) **Ambisyllabic *n* + *d* sequences**

dɛndur	'race (n.)'	*dʒinda*	'owner'
dʒindɔm	'trousers'	*gɛndɛn*	'pickaxe'
kɛnduŋ	'winding'	*lambɛnda*	'tomato'
mandi	'boulder'	*ɲɔnde*	'black/dark grey'
ŋundi	'blue/purple'	*ɕindi*	'red, brown, pink, light purple'
ʈɻando	'close'	*zɛndɔm*	'mosquito'

(13) **Ambisyllabic *ŋ* + *d* sequences**

kaŋduŋ	'bone flute'	(possible loan, < Tibetan?)
taŋdula	'bush (small, with berries)'	
puŋdo	'pundo (shotput sport)'	(Loan, < Dzongkha *dPuŋ.rDo*)

We similarly face questions with the imperative suffix. Given the alternation between [laj] and [aj], either of the solutions in (14) can account for the data in Table 6. With the infinitive the velar nasal behaved differently from the others, and with the imperative it is the coronal nasal that shows exceptionality.

(14)	a.	/laj/	→	[laj]	/	*n*__
			→	[aj]	/	elsewhere
	b.	/aj/	→	[laj]	/	*n*__
			→	[aj]	/	elsewhere

Support for the (14b) comes when we attempt to reconcile the data in Table 6 with the data from vowel-final verbs seen in Table 1. In Table 5 we posited a suffix of the form *-ɛ* (an argument could be made for the underlying form being *-e*, but this is not relevant here). Importantly, the mid front vowel is plausibly the development of simplification of the *aj* diphthong. One motivation for this is that VV sequences are strongly disfavoured in Bumthang, as discussed in 2.1, under (3). Furthermore, we have seen in Table 4 that VV sequences can be converted to GV or VG sequences. Beyond this, VVG or VVV sequences are unattested, and VG rhymes are eight times less frequent than VT or VN rhymes. With this as background, we can examine the two accounts in (14) with a vowel-final verb. If the underlying form is *laj*, we have no reason to suppose that the imperative of 'die' would be anything other than *sɛlaj*, while the attested form is *sjɛ ~ sɛ*. If the underlying form is *aj* then we can see that the suffixation of this to a vowel-final root would result in a VVG sequence, which is then reduced to the more acceptable VV sequence, which subsequently undergoes degemination (and optional glide insertion).

(15)	a.	*sɛ* 'die' +	*laj*	→	*sɛlaj*	→	?		
	b.	*sɛ* 'die' +	*aj*	→	*sɛaj*	→	*sɛɛ*	→	*s(j)ɛ*
					VVG		VV		V

This argues that the epenthetic account, (14b), is plausible. (14b) is a purely morphophonological rule, since other -V + -V sequences do not involve epenthesis, as can be seen in (16), with the genitive and instrumental/ergative suffixes.

(16) **Vowel-initial suffixes without epenthesis**

tɔwa	'hammer'	+ *e*	'genitive'	→	*tɔwae*	→	[tɔwaj], *[tɔwale]
		+ *i*	'instrumental'	→	*tɔwai*	→	[tɔwəj], *[tɔwali]

Table 7 summarised the proposed underlying forms of the verbal suffixes to this point, including a summary of segmental allomorphic variants.

I	impersonal irrealis	*Ø*	
II	personal irrealis	*-saŋ*	
III	incompletive	*-za*	
IV	impersonal perfective	*-na*	
V	personal perfective	*-s*	*Ø*
VI	consequential	*-mɔ*	
VII	infinitive	*-do*	*-dɔ*, *-du*, *-rɔ*, *-ru*
VIII	sequential	*-ze*	*-zɛ*, *-zi*
IX	imperative	*-aj*	*-laj*, *-ɛ*, *-e*,

Table 7. Affixal verbal categories based on vowel-final and nasal-final verbs

The forms posited in Table 7 are in some cases still just interim conclusions, and will be further revised.

2.3 Obstruent-final verbs

The account of verbal allomorphy becomes considerably more complicated when we consider plosive-final roots; the data can be seen in Table 8. Only three plosives are attested in codas: *p*, *t*, and *k*; the other obstruent attested in coda positions in the language, *s*, is not attested as a coda in any verb roots. As has been seen in the previous tables, forms I and II are unproblematic. The other rows all present data which expand our understanding in different ways.

	'fold'	'cut'	'chase'	'forget'	'clean'	'squeal'
	-p	*-p*	*-t*	*-t*	*-k*	*-k*
I	*tap*	*tup*	*krɔt*	*ɕit*	*phik*	*plak*
II	*tapsaŋ*	*tupsaŋ*	*krɔtsaŋ*	*ɕitsaŋ*	*phiksaŋ*	*plaksaŋ*
III	*tapsa*	*tupsa*	*krɔtsa*	*ɕitsa*	*phiksa*	*plaksa*
IV	*təpna*	*tupna*	*krɔtna*	*ɕitna*	*phiˑna*	*pləːna*
V	*taɸ*	*tuɸ*	*krɔs*	*ɕis*	*phiˑ*	*plaː*
VI	*tapmɔ*	*tupmɔ*	*krɔtmɔ*	*ɕitmɔ*	*phikmɔ*	*plakmɔ*
VII	*taptɔ*	*tuptu*	*krɔdɔ*	*ɕidu*	*phiɣu*	*plaɣɔ*
VIII	*tapsɛ*	*tupsi*	*krɔtsɛ*	*ɕitsi*	*phiksi*	*plaksɛ*
IX	*taβaj*	*tuβaj*	*krɔ(t)laj*	*ɕi(t)laj*	*phiɣaj*	*plaɣaj*

Table 8. Inflections of plosive-final verbs

The forms in row III show a suffix identical to that seen in previous tables, except for the voicing of the fricative. Examining just this suffix, either of the solutions in (17) is plausible; a voiceless fricative acquires voicing when surrounded by voiced segments; or a voiced fricative loses voicing when immediately following a voiceless segment. The only immediately apparent problem in assuming that the suffix is underlyingly voiceless is the failure of *-saŋ* to ever appear voiced, indicating that the rule in (8b) would be a morpheme-specific rule, not be a general rule in the language (this is a point we shall return to in 2.3). Alternatively, if the rule in (17a) is adopted, then there are no contradictions.

(17) **Fricative (de)voicing for the incompletive**

a. *za* → *sa* / [–voice]__

b. *sa* → *za* / [+voice]__

Data from the impersonal perfective in IV show us that final velar stops are unstable when suffixed. The forms in Row I demonstrate that final velar stops are allowed in the language, and further data would demonstrate that velar stops are the most common final stop (for both nasals and plosives). In a coda followed by another consonant, however, *-k* is much less frequent. We are aware of only two *k.m* sequences, in (18), and none with *k.n* or *k.ŋ*. Other ambisyllabic sequences of *k*.C are attested, but with obstruents rather than sonorants. As such, it appears that the loss of the final *-k* in the impersonal perfective is in keeping with phonological and phonotactic patterns attested more widely in the language. We note that the *-k* is not lost without trace; the preceding vowel is lengthened, with a low vowel exhibiting greater length than a high vowel.

(18) *tʃʰakmarɛ* 'all the time'

kurtɔktɔkma 'cheek'

The loss of a coda *k* in this form creates an otherwise unattested vowel length contrast in the language. From the roots p^h*i* 'open' and p^h*ik* 'clean', the impersonal perfective forms are p^h*ina* 'has opened' with p^h*iˑna* 'has cleaned', respectively.

Row V presents some challenges to our understanding of Bumthang morphophonology. The data from the vowel-final verbs in Table 1 suggest a personal perfective morpheme with the segmental form -*s*; the data from nasal-final verbs in Table 6 suggested that the language-wide ban on complex codas resulted in competition for the single licensed C position in the coda, with the consonant of the root preserved in preference to the affix, as summarised in (19).

(19) **Behaviour of the personal perfective in 2.1 and 2.2**

-*s*	→	-*s*	/	V __
	→	Ø	/	C __

The data in Table 8 show that the situation is more complex. The forms for 'chase' and 'forget' in Row V, might initially suggest that the suffixal segment is preferred over the coda of the root, but the other forms suggest a more complex pathway. (19) is updated with the data from Table 8 as (20). In (21–23) we will examine the different paths of fricativisation with different obstruent codas.

(20) **Allomorphy of the personal perfective**

-V + -*s*	→	-V*s*
-VN + -*s*	→	-VN
-V*p* + -*s*	→	-V*ɸ*
-V*t* + -*s*	→	-V*s*
-V*k* + -*s*	→	-Vː

The personal perfective forms for 'cut' and 'fold' have a bilabial fricative coda; the root ends in a bilabial stop, and the suffix is a fricative. The merger of subsegmental features from these two underlying segments could give rise to the [ɸ], as shown in (21).

(21) ***p* + *s* → *ɸ* in the personal perfective**

-C	+	C	→	C
[labial]		[coronal]		**[labial]**
[obstruent]		[obstruent]		[obstruent]
[–continuant]		**[+continuant]**		**[+continuant]**

If we accept this account for the bilabial fricatives, then a parallel process can account for the forms for 'chase' and 'forget' (and other *t*-final verbs). The only addition to the existing story possibly involves degemination, but since this parallels the constraints against complex codas and VV sequences, this is not insurmountable.

(22) ***t + s → s* in the personal perfective**

-C	+	C	→	C
[coronal]		[coronal]		[coronal]
[obstruent]		[obstruent]		[obstruent]
[–continuant]		**[+continuant]**		**[+continuant]**

For verbs with both the bilabial and alveolar stops the resulting fricative is attested in the language; [s] is a direct representation of the underlying segment /s/, and [ɸ] is a widely attested allophone of /pʰ/. For the dorsal stops we could posit the same process described in (21) and (22), but with the addition that [ɣ] is only permitted word-internally (as an allophone of V*g*V, especially near low vowels: [VɣV]). If we were to posit a process in parallel to (21) and (22) for velar stops, we would have (23).

(23) ***k + s → ɣ* in the personal perfective**

-C	+	C	→	C
[dorsal]		[coronal]		**[dorsal]**
[obstruent]		[obstruent]		[obstruent]
[–continuant]		**[+continuant]**		**[+continuant]**

(23) would result with a [ɣ] appearing in a coda position, which is illicit. Under this analysis the final [ɣ] is lost, but its earlier presence in the morphophonological process is evidenced in the compensatory lengthening displayed on the vowel.[11] This is more in keeping with the language's phonology, which does permit final *-k*, and so a rule deleting a final *-k* in favour of compensatory lengthening would be hard to justify.[12]

(24) *plak* + *-s* → *plaɣ* → *pla:*

In summary, the segment of the personal perfective is lost, but not without leaving a trace in the spirantisation of the preceding stop. In the case of the dorsal stop it continues to lenite until the consonant is lost, leaving behind a trace in the lengthened vowel (with high vowels minimally lengthened, compared to lower vowels).

Row VI is unproblematic. We see the retention of the final velar stop before the *m* of the suffixed *-mɔ*, reflecting the availability of the *k.m* sequence in the lexicon (18), albeit at low frequency.

The vowel height dissimilation that we find in the infinitives in Row VII is something we have seen before, but there are new challenges: from Table 7 we assume that the infinitive is

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[11] The fricative might be considered to be an [x] in the intermediate stage. The choice of [x] or [ɣ] does not affect the analysis here; what is important is that it combines the place of the root's coda with the manner of the suffix.

[12] Some justification can be found in the copular verb *na*, which in combination with the suffix *-za* is realised as [naksa], suggesting that for this one verb a word-final *k* coda is lost. In neighbouring Kurtöp (Hyslop 2014) final *ks* are regularly lost.

underlyingly *-do*, and in Table 8, we see three possible outcomes of the addition of the infinitive to a plosive-final root. When suffixed to a *-p* root, the infinitive shows a devoiced consonant; when suffixed to a *-t* root, the final consonant of the root is not apparent in the phonetic form; and finally, when suffixed to a *-k* root the consonant of the suffix does not apparently have any role in the final phonetic form, but the final consonant of the root is lenited to [ɣ].

(25) **Plosive final verbs + infinitive**

-p	+	*-do*	→	*-pto*
-t	+	*-do*	→	*-do*
-k	+	*-do*	→	*-ɣo*

There is only one known example of a *p.d* sequence, in the onomatopoeic word *depdep*, clearly involving reduplication, in (26). Sequences of the form *p.t* are rare, but attested, in (27). There are no sequences of *t.d*, and *t.t* would be ruled out on the general principle of degemination.[13] Sequences of *k.d* are unattested, but *k.t* sequences are quite common in the lexicon, shown in (28). Based on this we might expect the infinitive of 'squeal' in Table 8 to be **plaktɔ*, rather than the attested *plaɣɔ*. Recall, however, from Table 6 and (8) in 2.2 that despite the existence of *ŋ.d* sequences in the language, the infinitive of *ŋ*-final verbs contains no evidence of the consonant of the infinitive suffix. The evidence of Table 8 is that this is true for *k*-final verbs as well: the infinitive irregularly takes the form *-o* following velar codas.

(26) *dɛpdɛp* 'fully grown'

(27) *ɖɽɔptɛn* 'stairs'
hapta 'week' (Loan < Hindi/Nepali)

(28) *blaktaŋ* 'messy food remains (table, clothes)'
bruktula 'ant'
tʃaktap 'closed door'
kʰaptɔŋ 'lid'
kurtɔktɔma 'cheek'
mɔktuma 'fist'
ɲɔktoma 'sweet'
ɲɔktun 'bland'
ɔktɔk 'ground floor'

[13] There is one known exception, *imimma* 'hide-and-seek'. This appears to be composed of **imim* + the historical nominalising suffix *-*ma*.

pɔktɔ	'hill'
pɔktɔŋ	'jar'
tɔktɔk	'hard, medium heavy bounce' (onomatopoeia)
tɔktɔla	'darts (game)'
tsuktu	'blanket (type)'

We must conclude that there are two allomorphs of the infinitive suffix, with the monovocalic -o occurring after velar-final stems, both *k* and *ŋ*. Given the need to posit different allomorphic bases, we should revisit the stop/trill alternation posited in Table 7 to account for the form of the infinitive suffix after nasals vs. after vowels. A problem with that analysis is apparent when we consider the contrast between /d/ and /r/, both initially and intervocalically, as seen in (29) and (30). Given that [d] is not in an allophonic relationship with [r], *both* the accounts presented earlier in (8) cannot be considered to contain phonological rules, but rather rules of allomorphy.

(29)	*daŋ*	'hooks (for hanging clothes, bags)'	*raŋ*	'even, also'
	dɛ	'comfort'	*rɛ*	'red cane (sp.)'
	di	'write'	*ri*	'roll'
	dɔŋ	'front'	*rɔŋ*	'stumble into'
	dɔt	'sleep'	*rɔt*	'rock slide'
	duk	'feel, experience'	*ruk*	'herd (v.)'

(30)	*adar*	'how'	*ara*	'arak; hard liquor' (Loan?)
	phadɛnma	'bat'	*tʃwarɛ*	'eleven'
	zadɔ	'all (people)'	*dʒarɔ*	'raven'
	pʰɛdang	'half'	*bɛra*	'probably'

The sequential suffix in VIII shows the same devoicing that we observed with the incompletive in III. Just as with the infinitive forms, the imperative forms in Table 8 similarly shows continuity with the imperative forms for nasal-final verbs in Table 6. Verbs ending with bilabial or velar plosives behave identically to verbs ending with bilabial or velar nasal, consistently showing a suffix of the form -*aj*, but additionally showing lenition of the final consonant of the verb root. With *n*-final verbs the imperative is consistently -*laj*; with *t*-final verbs the imperative is consistently -*laj*, and the final consonant of the verb is inconsistently lost. The -*laj* form, rather than being a phonologically conditioned variant of the imperative suffix, must be considered a distinct allomorphic base. One factor behind the erratic loss of the final consonant in a verb like *sut* 'kill', resulting in two imperative variants, *sutlaj* and *sulaj*, can be found in the complete absence of any coronal + lateral sequences in the language (apart from the form in footnote 8). The only factor behind the erratic retention of the final *t* is stipulation; since the *laj* base is produced 'outside' the regular phonological rules of the language, it is exempt from the **t.l* condition (we shall expand on this in the next section).

At the end of this section, we present the updated analysis of the verbal suffixes in Table 9, but now considering some of the alternations to involve different allomorphic bases, and some of the alternations to involve phonologically-motivated variation in these bases.

	Verbal form	Morphemes	Phonetic variation
I	impersonal irrealis	*Ø*	
II	personal irrealis	*-saŋ*	
III	incompletive	*-za*	*-sa*
IV	impersonal perfective	*-na*	[k → Ø, Vː]
V	personal perfective	*-s*	*Ø*, [ɸ], [k → Ø, Vː]
VI	consequential	*-mɔ*	
VII	infinitive	*-do / -ro / -o*	*-dɔ*, *-du*; *-rɔ*, *-ru*; *-ɔ*, *-u*
VIII	sequential	*-ze*	*-zɛ*, *-zi*, *-sɛ*, *-se*, *-si*
IX	imperative	*-aj / -laj*	*-ɛ*, *-e*

Table 9. Affixal verbal categories based on vowel-final, nasal-final and plosive-final verbs

2.4 Liquid and glide-final verbs

The final class of verbs consists of verbs ending with non-nasal sonorants. Phonetically we find verbs in the impersonal irrealis, which to this point has been identical to the posited root form, segmentally, that end with [Vr] or [Vj]; there are no verbs with a final [Vl] or [Vw]. In this section I argue that we must consider that there are verbs with a final underlying lateral. Before discussing the verbs, it is useful for us to take a diversion into aspects of the syllable structure of Bumthang.

Firstly, we can undeniably attest lateral codas in Bumthang, though they are equally undeniably peripheral in the phonology. Of the forms in (31), representing all of the words with lateral-final syllables known from the corpus available, the first two are clearly onomatopoeic; the form C_1(*r*/*l*)*a*$C_2C_1VC_2$*a* is found overwhelmingly with onomatopoeic words. The next three words are clearly loans. The etymology of *galpane* is unclear, but it is worth noting that the Dzongkha word *kapne* 'scarf' bears a plausible relationship to *galpane*, although it offers no insight into the presence of the lateral (in Written Dzongkha it is *bKab.ne*). Finally, no simple explanation is apparent for the word *pulbu* 'Wednesday' (possibly related to Dzongkha; in Written Dzongkha 'Wednesday' is '*Brug.kZa*'.*Phurb*, with the last syllable possibly related, though not obviously through borrowing). We can note that these laterals, other than the very recent loans, occur in a non-final syllable of a polysyllabic work, and that, apart from *pulbu*, all of the laterals are preceded by a low /a/ vowel. All of this suggests that lateral codas are marginal in Bumthang, a conclusion supported by the data in (32) and (33), which show that historical **l* is frequently realised as a palatal glide in Bumthang in both onsets and codas – and that recent loans, such as 'ball' in (33a), can be subject to this sound change (see also Michailovsky and Mazaudon 1994, Hyslop 2013 for further examples of these correspondences). In (32–35) the Bumthang forms are compared with Written Tibetan (WT), Written Dzongkha (WDz), and Matisoff's (2003) reconstructions for Proto-Tibeto-Burman (PTB). Bumthang is not descended from Tibetan or Dzongkha, but has been influenced by both languages. The Proto-Tibeto-Burman forms are of course subject to revision (see, e.g., Sagart 2006).

(31)	a.	*balbɛla*	'gravy forming from melting cheese'
	b.	*malmɛla*	'losing coherence'
	c.	*mobajl*	'mobile phone' (< English *mobile*)
	d.	*sajkal*	'bicycle' (< English *cycle*)
	e.	*kalkata*	'Calcutta' (place name)
	f.	*galpane*	'scarf'
	g.	*pulbu*	'Wednesday'

(32)	a.	*jak*	'hand, arm'	WT *lag.pa*, WDz *lag*, PTB **lak*
	b.	*jam*	'road, path'	WT/WDz *lam*, PTB **lam*
	c.	*jɔk*	'sheep'	WT/WDz *luk*, PTB **luk*
	d.	*jaŋ*	'stand'	WT *laŋ*, WDz *loŋ*, PTB **lyaŋ* 'wait'
	e.	*ja*	'highlands'	WT/WDz *la* 'pass'

(33)	a.	*bɔj*	'ball'	English/Dzongkha *ball*
	b.	k^haj	'twenty'	WDz *khal*, PTB **m-kul*
	c.	*ŋɔj*	'silver'	WT/WDz *dŋul*, PTB **ŋul*
	d.	*baj*	'wool'	WT/WDz *bal*
	e.	*kaj*	'back'	WT/WDz *sGal-*, PTB **kal*
	f.	*paj*	'forehead'	WT *dPral.pa*, WDz *dPyalw*, PTB **pral*
	g.	*babaj*	'frog'	WDz *sBalb*, PTB **bal*

On the other hand, the sound change exemplified in (32) and (33) are not exceptionless; in (34) we can see a number of words which have retained **l* as *l*, and in (35) a selection of loanwords which, unlike 'ball' in (33a), have retained a coda **l* as *l*. Alternatively, there are as-yet undiscovered conditioning factors affecting the reflex of **l*, or the proto-forms are more heavily differentiated than is often thought (e.g., Hill 2011, 2019). It is noteworthy that many of the forms in (34) contain clusters in the comparanda, while in (32) and (33) this is not the case.[14] The near-minimal case of 'sheep' in (32c) and 'wind' in (34c), or 'leaf' in (34f), make any such conditioning environments rather obscure, and possibly irregular.

[14] Furthermore, the comparative evidence suggests that these earlier clusters had already simplified to simple laterals by the Proto East Bodish stage.

(34)	a.	*lup*	'study'	PTB **lwap*, WT *sLop*, WDz *lhap*
	b.	*leŋ*	'field'	PTB **b-liŋ* (WT/WDz *zhiŋ*)
	c.	*lɔŋ*	'wind'	WT/WDz *rLuŋ*
	d.	*la*	'month'	PTB **s/g-la*, WT *zLa.ba*, WDz *zLaw*
	e.	*li*	'tongue'	PTB **ley* (WT/WDz *lCe*)
	f.	*lamba*	'leaf'	PTB **lap*? (WT *lo.ma*)
	g.	*liwa*	'flea'	PTB **s-ləy*, WT *lJi.pa* (WDz *ki.zhig*)
	h.	*blɛ*	'four'	PTB **ləy* (WT/WDz *bZhi*)

(35)	a.	*gilas*	'glass'	
	b.	*bɔtɔl*	'bottle'	
	c.	*iskul*	'school'	
	d.	*dʒɔla*	'bag'	< Nepali *jhola*
	e.	*thali*	'plate'	< Hindi/Nepali *thali*
	f.	*tɛbɔl*	'table'	
	g.	*lama*	'monk'	< WT *bLa.ma*
	h.	*ɲinlam*	'day's walk'	< Tibetan 'day' + 'path'
	i.	*lamtʃʰɛ*	'elephant'	< Tibetan *laŋ.chen*?, WDz *gLaŋmo.ce*
	j.	*ləjdar*	'grater'	< WT *lap.rDar*?, WDz *brDar-*
	k.	*lakʂˡup*	'glove'	< WT/WDz *lak.shups*
	l.	*laŋgu*	'bull'	< WT/WDz *gLaŋ*
	m.	*lɔpʰɔn*	'teacher'	< WT *sLob.dGe*, WDz *sLob.dPon*
	n.	*luksuj*	'habit'	< WT/WDz *gShis.lugs*
	o.	*dʒaliŋ*	'flute'	< WT/WDz *gLiŋ*

These data show that an **l* > *j* sound change has applied incompletely and, evidenced from loanwords, is ongoing, synchronically, in Bumthang. As a result of this, we should not be surprised to see alternations between [l] and [j] in the language, and this is exactly what we find. In (36a) we can see that the genitive is regularly realised as an *-e* suffix following a consonant; following a vowel it raises to form the offglide to a diphthong, seen in (36b). When the word to which the *-e* is attached is already diphthongal, with a final *-əj*, then a we see the same behaviour as in (36a). With a word with a final *-aj*, however, a lateral is found preceding the *-e*. If we were to posit /mal/ as an underlying form for 'house', then the variation in (36d) can easily be explained by appealing to the historically attested **l* > *j* process, with this change most favoured in the coda position, and only imperfectly applied when the suffixed vowel allows it to be realised in an onset position.

(36) **Alternations with *l* in the genitive**

a.	*krɔŋ*		'village'
	krɔŋ-e	*naŋ-o*	'in the village'
	village-GEN	inside-ALL	
b.	*ka*		'snow'
	kaj	*naŋ-o*	'inside the snow'
	snow:GEN	inside-ALL	
c.	*tʃaksəj*		'chain'
	tʃaksəj-e	*dʒuk*	'end of the chain'
	chain-GEN	end	
d.	*maj*		'house'
	majle	*naŋ-o*	'in the house'
	house:GEN	inside-ALL	

With this as background, we can now examine the new verbal data. Pre-empting the analysis, the verbs in Table 10 are split into *r*-final, *j*-final, and *l*-final groups.

	'prepare'	'blow (nose)'	'churn'	'buy'	'sell'	'separate'
	-r	*-r*	*-j*	*-j*	*-l*	*-l*
I	*sar*	*ts^hir*	*$t^həj$*	*ŋuj*	*muj*	*p^hrej*
II	*sarsaŋ*	*$ts^hirsaŋ$*	*$t^həjsaŋ$*	*ŋujsaŋ*	*mujsaŋ*	*$p^hrejsaŋ$*
III	*sarza*	*ts^hirza*	*$t^həjza$*	*ŋujza*	*mujza*	*p^hrejza*
IV	*sərna*	*ts^hirna*	*$t^həjna$*	*ŋujna*	*mujna*	*p^hrejna*
V	*sar*	*ts^hir*	*$t^həj$*	*ŋuj*	*muj*	*p^hrej*
VI	*sarmɔ*	*$ts^hirmɔ$*	*$t^həjmɔ$*	*ŋujmɔ*	*mujmɔ*	*$p^hrejmɔ$*
VII	*sartɔ*	*ts^hirtu*	*$t^həjrɔ$*	*ŋujru*	*mujru*	*p^hrejro*
VIII	*sarzɛ*	*ts^hirzi*	*$t^həjzɛ$*	*ŋujzi*	*mujzi*	*p^hrejze*
IX	*sa(r)laj*	*$ts^hi(r)laj$*	*$t^həjɛ$*	*ŋujɛ*	*mujlaj*	*$p^hrejlaj$*

Table 10. Inflections of liquid- and glide-final verbs

Examining the rhotic-final verbs first, we can make the following observations. The interactions with the verbal suffixes present nothing new, but are a combination of what has been seen with *n*-final verbs in Table 6 and *t*-final verbs in Table 8, as summarised below in (37). The behaviour of the verbs is most close to the *n*-final verbs, reflecting their shared sonority, but the behaviour of the imperative mirrors that of the *t*-final verbs. The infinitive in VII is surprising; from all the other data we would expect a voiced consonant in this suffix, **sarɔ* or **sardɔ*, rather than the attested *sartɔ* for 'to prepare'. Given that the incompletive in III shows the allomorph expected following a voiced segment, we must conclude that the appearance of *tɔ* represents a further (idiosyncratic) morphemic base.

(37) **Comparing *r*-final verbs to *n*-final and *t*-final verbs**

I	*Ø*;		identical to both *n*- and *t*-verbs	
II	*-saŋ*;		identical to both *n*- and *t*-verbs	
III	*-za*;	identical to *n*-verbs		
IV	*-na*;		identical to both *n*- and *t*-verbs	
V	*Ø*;	identical to *n*-verbs		
VI	*-mɔ*;		identical to both *n*- and *t*-verbs	
VII	*-to*;		dissimilar to both *n*- and *t*-verbs	
VIII	*-ze*;	identical to *n*-verbs		
IX	*-laj*;			identical to *t*-verbs

The *j*-final verbs are an interesting mixture of vowel-final verbs and nasal-final verbs, as laid out in (38). In all cases but one, the behaviour of the suffixes with glide-final verbs is compatible with the behaviour of the suffixes with vowel-final verbs; in most cases, the behaviour is also compatible with the nasal-final verbs as well. The perfective, however, does not behave in a way compatible with a vowel-final root, and the *Ø* segmental realisation of the personal perfective and can only explained if 'churn' and 'sell' in Table 10 are consonant-final.

(38) **Comparing *j*-final verbs to V-final and *n*-final verbs**

I	*Ø*;		identical to both V- and *n*-verbs	
II	*-saŋ*;		identical to both V- and *n*-verbs	
III	*-za*;		identical to both V- and *n*-verbs	
IV	*-na*;		identical to both V- and *n*-verbs	
V	*Ø*;			identical to *n*-verbs
VI	*-mɔ*;		identical to both V- and *n*-verbs	
VII	*-ro*;	identical to V-verbs		
VIII	*-ze*;		identical to both V- and *n*-verbs	
IX	*-ɛ*;	identical to V-verbs		

We are then left with verbs that behave like 'sell' and 'separate'. These verbs are identical in behaviour to the glide-final verbs, with the exception of the imperative. We have seen two allomorphs with the imperative, *-laj* and *-aj*, the distribution of which is shown in (39). The allomorph *-aj* has the *-ɛ* variant following a vowel, as discussed in 2.1, and also following the glides. The basic variant

-aj occurs following consonants; the allomorph *-laj* is found following stems ending in *n*, *t*, and *r*: all coronal consonants. The most parsimonious explanation for the appearance of *-laj* on *muj* 'sell' and *pʰrej* 'separate' (and other verbs that behave similarly) is that these verbs, too end in a coronal consonant.

(39) **Imperative allomorphy with different verb types**

-V + imperative:	-(G/V)*ε*
-m + imperative:	*-maj*
-n + imperative:	*-n**laj***
-ŋ + imperative:	*-ŋaj*
-p + imperative:	*-βaj*
-t + imperative:	*-(t)laj*
-k + imperative:	*-ɣaj*
-r + imperative:	*-(r)**laj***
-j + imperative:	*-jε*
'*-l*' + imperative:	***-laj***

Assuming that 'sell' is underlyingly /mul/, all of the suffixal forms can be accounted for. Rows I–VI, and VIII, are unproblematic. We have just discussed the imperative; if the verb ends in a coronal consonant, the *-laj* form is expected. As a complication, the *-laj* allomorph must be selected before the final lateral is converted to the glide seen in all of the surface forms in Table 10, while the form of the infinitive suffix is selected following the conversion of the lateral to the glide, as illustrated in (40) and (41), where strike-through represents non-selected morpheme bases.

	Verbal form	Morphemes	Phonetic variation
I	impersonal irrealis	*Ø*	
II	personal irrealis	*-saŋ*	
III	incompletive	*-za*	*-sa*
IV	impersonal perfective	*-na*	[k → Ø, Vː]
V	personal perfective	*-s*	Ø, [ɸ], [k → Ø, Vː]
VI	consequential	*-mɔ*	
VII	infinitive	*-do / -to / -ro / -o*	*-dɔ*, *-du*; *-tɔ*, *-tu*; *-rɔ*, *-ru*; *-ɔ*, *-u*
VIII	sequential	*-ze*	*-zε*, *-zi*, *-sε*, *-se*, *-si*
IX	imperative	*-aj / -laj*	*-ε*, *-e*

Table 11. Affixal verbal categories based on all data

(40) **If lateral → glide precedes suffixation**

Infinitive	Imperative	
mul	*mul*	Roots
muj	*muj*	**l* → *j*
muj + ~~*-do / -to /*~~ *-ro* / ~~*-o*~~	*muj* + *-aj* ~~*/ -laj*~~	Affixation
muj + *-ru*	*muj* + *-ɛ*	Allophony
mujru	**mujɛ*	Outputs

(41) **If lateral → glide follows suffixation**

Infinitive	Imperative	
mul	*mul*	Roots
mul + *-do* / *-to* ~~*/ -ro / -o*~~	*mul* + ~~*-aj /*~~ *-laj*	Affixation
muldu / *multu*	*mullaj*	Allophony
mujdu / *mujtu*	*mullaj*	**l* → *j*
**mujdu* / **mujtu*	*mujlaj*	Outputs

The only clear solution is to have different affixes applying at different points with respect to the lenition of laterals.

The alternative to the solution of some verbs being underlyingly lateral-final is to posit that they in fact consist of a sort of exception *j*-final stem, with the only exceptionality applying to the imperative form; we would have, in effect, *ŋuj*$_1$ 'buy', and *muj*$_2$ 'sell', with *j*$_1$ and *j*$_2$ representing palatal glides with different morphophonological behaviour (similarly for (36c) and (36d)). This seems to be an over-engineered and arbitrary solution, given that the exceptional behaviour involves the appearance of a lateral at the juncture between the stem and the suffix, and that we have seen ample evidence of the (gradual, incomplete) change of **l* > *j* in the language, it does not seem to be much of a stretch to posit /ŋuj/ vs. /mul/ to account for the variation.

2.5 Irregular verbs

The generic verb *bu* 'do' and the high-frequency verbs *ra* 'come' and *gaj* 'go' all show irregular imperative forms: [ba] 'do!' for expected *[bwɛ], [ʂ^{l}aj] 'come!' for expected *[raj], and [galaj] 'go!' for expected *[gajlaj]. The formation of the imperative for these three verbs is illustrated in (42– 44). For 'go' we expect the *-laj* suffix to be selected because of the final lateral, followed by the lenition of the *l* in a coda position. The attested form appears to be the result of degemination of the *ll* sequence, rather than lenition of the first lateral, applying to the verb. With 'do' the expected form is **bwɛ*; the attested form appears to have arisen from glide truncation, rather than diphthongisation, applying to the *-aj* suffix. Following this we fail to see glide formation, but rather simple deletion of the first vowel in the VV sequence. For 'come' the only difference from the expected form is the change in the initial consonant, and this cannot be motivated by any of the phonological rules we have discussed here.

(42)	*gal + laj*	→	*gallaj*	→	**gajlaj*		
				→	*galaj*		
(43)	*bu + aj*	→	*buaj*	→	*buɛ*	→	**bwɛ*
				→	*bua*	→	*ba*
(44)	*ra + aj*	→	*raaj*	→	**raj*		
				→	*raj*	→	*ʂ*^{ɭ}*aj*

With /gal/ 'go' the infinitive is *gajdo*, not (expected?) **gajro*. This is actually very simply explained, by returning to the dilemma about the relative timing of lateral lenition discussed with respect to (40) and (41) above. We saw that for the verbs in Table 10, which represent the regular verbs, the correct forms arise if we assume that lateral lenition applies before affixation. For 'go', however, the attested form can be derived by exceptionally applying affixation before lenition. In this way, and given that the derivation of the imperative form also requires us to apply affixation before lenition. This allows for an argument that, for the lateral-final verbs, in fact 'go' is the only regular verb, and all the other lateral-final verbs, including those in Table 10, are irregular. (45) illustrates the different steps in this process (if lenition preceded suffixation, we would expect **gajro* and **gajɛ*, neither of which are licit).

(45) **If lateral → glide preceded suffixation**

Infinitive	Imperative	
gal	*gal*	Roots
gal + -do / -to ~~/ -ro / -o~~	*gal + ~~-aj /~~ -laj*	Affixation
galdo / galto	*gallaj*	Allophony
galdo / galto	*galaj*	Degemination
gajdo / gajto	*galaj*	**l → j*
*gajdo / *gajto*	*galaj*	Outputs

3 Conclusions

We have seen that variation in the suffixes of Bumthang verbs can be divided into variation within the domain of morphology and morphological variation, which affects the infinitive and imperative suffixes, and variation that falls within the scope of phonology and phonological constraints, seen in all affixes except the realis affixes and the consequential suffix, which are invariant.

The question of 'regularity' is somewhat vexed. While we can account for the great majority of verbs with some phonologically-conditioned morpheme stem choice, for the infinitive and the imperative, and allomorphy conditioned by the final vowel and consonant of the verb stem in other cases, we note that for *l*-final stems it is not possible for a single order of derivation, in (40) and (41), to account for the outputs of both the infinitive and imperative inflections, except in the case of the verb 'go'. The paradox of rule ordering exists for the regular, in terms of numbers of verbs, set of *l*-final stems; in terms of regularity of rule processes, on the other hand, only one *l*-final stem is regular. Depending on whether we define regularity in terms of the spread in the lexicon or in terms of the application of phonological processes, we have a different set of verbs.

Abbreviations

ALL	allative	GEN	genitive

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