

## THE TONAL CLASSIFICATION OF CHUNGLI AO VERBS\*

Daniel Bruhn

University of California, Berkeley

This paper presents an analysis of the tonal behaviour exhibited by verb stems in Chungli Ao, a Tibeto-Burman language of north-east India. Three verb stem classes are established, and their tonal properties, along with those of various inflectional suffixes, are examined within the framework of Autosegmental Phonology (Goldsmith 1976a, 1976b).

Keywords: Tibeto-Burman, Naga, Chungli, Ao, tone, verb, morphology

### 1. CHUNGLI AO

Chungli Ao is the prestige dialect of Ao, a Tibeto-Burman language spoken in Nagaland, a hill state in north-east India. Chungli Ao speakers number around 90,000, while the related dialect of Mongsen Ao has approximately 70,000 speakers (Coupe 2008). Although genetic classification of the so-called “Naga” languages is far from settled, a recent tentative attempt categorizes these two dialects of Ao with the languages of Yacham-Tengsa, Sangtam, Yimchungrü, and Lotha to form the “Ao Group” (Burling 2003).

Most of the linguistic work on the Chungli variety of Ao is from the late 19<sup>th</sup>–early 20<sup>th</sup> century, consisting of a missionary grammar (Clark 1893), a voluminous (977pp.) Ao-English dictionary (Clark 1911), and a short (23pp.) grammatical description (Avery 1886). None of these publications, however, indicates tone. More recent works by Gowda include a phonetic reader designed for non-native speakers (1972) and a sketch grammar (1975). Both of these works include indications of tone levels, but lack a detailed analysis of tonal phenomena.

The previously-neglected Mongsen variety has received more attention lately with the publication of Coupe’s phonetic and phonological description of Mongsen Ao as spoken in Waromung village (2003), which contains detailed phonetic measurements of segmental and tonal phenomena. Coupe’s most thorough work, however, is a 526-page grammar of Mongsen Ao as spoken in Mangmetong village (2007). This publication contains a short chapter devoted to prosody, describing lexical & morphological tone, tone sandhi, and intonation in Mongsen Ao. Though Coupe presents a few examples of internal tone sandhi triggered by verbal morphology, he concludes with the disclaimer that a detailed analysis of these patterns “lies outside the scope of the present work” (2007: 72).

---

\* Special thanks to Larry Hyman and Russell Rhodes for their assistance in conducting this research, and most of all to Moa Imchen, our Chungli Ao consultant. *Kanga pelar!*

The purpose of this paper, therefore, is to present a preliminary investigation of tonal phenomena in the verbal morphology of Chungli Ao<sup>1</sup>. Although explanatory analyses are couched in the theoretical framework of Autosegmental Phonology (Goldsmith 1976a, 1976b), the approach taken here is motivated by a desire to produce a workable analysis of the data rather than vindicate a particular theory.

Section 2 presents a sketch of the phonological inventory of Chungli Ao, while Section 3 introduces the basic segmental properties of Chungli Ao verbal morphology. Section 4 constitutes the bulk of the paper, presenting a proposal for three verb stem tone classes and the underlying tones of various inflectional suffixes, describing their tonal behaviour within the framework of Autosegmental Phonology. The paper is concluded in Section 5.

## 2. PHONOLOGICAL INVENTORY

For the purpose of familiarizing the reader, the following sections present the phonological inventory of Chungli Ao:

### 2.1. Consonants

	<i>Bilabial</i>	<i>Dental/Alveolar</i>	<i>Postalveolar</i>	<i>Palatal</i>	<i>Velar</i>	<i>Glottal</i>
<i>Nasal stops</i>	m	n			ŋ	
<i>Oral stops</i>	p, p <sup>h</sup>	t, t <sup>h</sup>			k, k <sup>h</sup>	ʔ
<i>Affricates</i>		ts	tʃ			
<i>Fricatives</i>		s, z	ʃ			h
<i>Approximants</i>	w	ɹ, l		j		

Table 1. Chungli Ao consonants

The glottal stop phoneme is contrastive (e.g. *a<sup>3</sup>-ŋu<sup>1</sup>* ‘saw’ vs. *a<sup>3</sup>-ŋuʔ<sup>1</sup>* ‘bit’) but has limited distribution, appearing only word-finally and disappearing with the addition of suffixes (e.g. *a<sup>3</sup>-ŋu<sup>1</sup>-taŋ<sup>1</sup>* ‘while biting’).

Although aspirated stops are included in Table 1 for the sake of completeness, aspiration in Chungli Ao is marginal and is contrastive on very few words (e.g. *taŋ<sup>3</sup>* ‘now’ vs. *t<sup>h</sup>taŋ<sup>3</sup>* ‘only’).

The voiceless glottal fricative /h/ is restricted to syllable onsets and appears only in *hauʔ<sup>1</sup>* ‘yes’, *haiʔ<sup>1</sup>* ‘okay’, *ha<sup>3</sup>tʃi<sup>1</sup>* ‘sneezed’, and some loanwords.

<sup>1</sup> It should be noted that the current work is not intended to be exhaustive, as a number of verbal suffixes were left unexplored for the sake of time. It is the author’s hope to continue investigating these areas in the future.

## 2.2. Vowels

	Front	Central	Back
High	i	ɨ	u
Mid	e	ə	
Low		a	

Table 2. Chungli Ao vowels

The only monomorphemic diphthongs that appear are /ai/, /au/, /ia/, /iu/, /ui/, and /ua/.

## 2.3. Tones

Chungli Ao exhibits a register tone system<sup>2</sup>. The tone-bearing unit is the syllable, and three tone levels exist: high (H), mid (M), and low (L). The H tone has a limited distribution, and usually appears before a L tone in a disyllabic H.L pattern<sup>3</sup> or monosyllabic HL contour. The only underlying contour tones on monosyllables are HL and LM, though HM contours can surface when HL is followed by a syllable bearing M or H. Across word classes, the most common tone patterns for disyllables are M.M and H.L, with L.L and L.M less common. M.L and H.H patterns are very rare and/or marginal. (For more on lexical tone in Chungli Ao, see Rhodes 2009).

Surface tone is indicated in this paper by superscripted tone numbers that appear after each syllable, where 3 is high and 1 is low, e.g. *rep<sup>2</sup>rang<sup>2</sup>-tar<sup>3</sup>1* (M.M-HL) ‘is now watching’. Where not depicted with autosegmental notation, underlying tones are represented with superscripted M, H, and L, e.g. /-tʂi<sup>L</sup>/ (irrealis suffix).

## 3. OVERVIEW OF SEGMENTAL MORPHOLOGY

Chungli Ao verbs lack person and number marking, and the agglutinative verbal morphology conforms to the scheme shown in Table 3. (Note that holds for both finite and non-finite forms.)

PREFIX	–	STEM	–	LEXICAL SUFFIX	–	DERIV. SUFFIX(ES)	–	INFLEC. SUFFIX
<i>me-</i>				<i>-maʔ</i> ‘completely’		<i>-tʂiʔ</i> BEN		<i>-tʂi</i> IRR
<i>te-</i>				<i>-et</i> ‘persistently’		<i>-tep</i> RECIP		<i>-əɪ</i> PRES
				etc.		etc.		etc.

Table 3. Chungli Ao verbal morphology

<sup>2</sup> See Hyman (2007) for a description of another register system in the contour-saturated area of Southeast Asia.

<sup>3</sup> Throughout this paper, periods represent syllable boundaries, while dashes indicate morpheme boundaries.

Verb stems (which are identical to the preterite form, since the past suffix is - $\emptyset$ ) fall into two types: bare verb roots (e.g.  $tʃa^2tʃa^2$  ‘walked’), and verb roots that bear a semantically-empty *a*-prefix (e.g.  $a^2-si^2$  ‘died’). This prefix, which does not appear in Mongsen Ao, appears to be a reflex of the Proto-Tibeto-Burman glottal prefix  $*ʔa-$ , whose reflexes in various languages have a number of semantic functions (Matisoff 2003, p.c.). In Chungli Ao, however, the *a*-prefix serves no apparent semantic function.

This *a*-prefix also disappears upon the addition of certain verbal morphemes, such as the present-perfect suffix  $/-u^Hku^M/$  (e.g.  $a^2-rem^2$  ‘buried’ but  $rem^2-u^3ku^2$  ‘has buried’). With respect to this *a*-dropping behaviour, the verbal suffixes that appear in this paper are categorized as follows:

<i>a</i> -Preserving		<i>a</i> -Dropping	
$-tsi$	IRREALIS	$-aŋ$	IMPERATIVE
$-əɪ$	PRES	$-taɪ$	IMMED.PRES
$-\emptyset$	PAST	$-uku$	PRES.PERF

Table 4. Relevant *a*-preserving and *a*-dropping verbal suffixes

Finally, most verb stems are disyllabic, although there are a few monosyllabic and trisyllabic stems. The monosyllabic stems typically consist of single-vowel roots prefixed with *a* (e.g.  $a^2-u^2$  ‘went’) or *a*-less monosyllabic roots with coda consonants (e.g.  $aɪ^2$  ‘sewed’)<sup>4</sup>.

## 4. TONAL MORPHOLOGY

### 4.1. The Tone System

As mentioned in Section 2.3, the H tone most often appears before L to form a disyllabic H.L pattern or a monosyllabic HL contour. This fact, coupled with the rarity of disyllabic M.L patterns and non-existence of monosyllabic ML contours across word classes, suggests an analysis of Chungli Ao tone in which most H tones are the result of an “upstepped” M before L, as is the case with the Engenni language of Nigeria (Thomas 1974, 1978). The following analysis may therefore be utilized to portray the Chungli Ao tone system<sup>5</sup>:

<i>Underlying Tones</i>	<i>Rule</i>	<i>Surface Tones</i>
L, M, H	$M \rightarrow H / \_ L$ “upstep”	L, M, H (underlying), H (upstepped)

Table 5. Chungli Ao tone system

<sup>4</sup> The [a] in ‘sewed’ never drops out, and thus is not an *a*-prefix.

<sup>5</sup> One might also analyse this type of system as consisting of underlying L, H, and  $\emptyset$ , with  $\emptyset$  realized as H before L and defaulting to M elsewhere (cf. the treatment of Engenni in Hyman 2001). At the present, however, the introduction of a zero tone into the current analysis of Chungli Ao would appear to be an unnecessary complication with little explanatory advantage.

Additional evidence for the presence of upstepped M tones comes from the fact that our consultant often produces M.L patterns in casual speech which are clearly H.L in careful speech.

With this scheme in place, the aforementioned *a*-prefix can now be regarded as bearing an underlying M tone, which surfaces as H (level 3) before a monosyllabic verb root bearing L, but retains M (surface level 2) before M. This is illustrated as follows:

- (1) /a<sup>M</sup>-lep<sup>L</sup>/ → (upstep) → a<sup>3</sup>lep<sup>1</sup> ‘cut’  
 (2) /a<sup>M</sup>-kung<sup>M</sup>/ → a<sup>2</sup>kung<sup>2</sup> ‘crowed’

The relevance of tone to verb stem classification is discussed in the next section.

#### 4.2. Stem Tone Classes

If one focuses on verb **roots**, there are at least six different classes that can be formed based on root size, tone, and requirement for the *a*-prefix to form the verb stem, as depicted in Table 6.

<i>Root Size</i>	<i>Tone</i>	<i>Stem requires a-prefix?</i>	<i>Example (stem)</i>	<i>Stem Pattern</i>
σ	L	Yes	a <sup>3</sup> -lep <sup>1</sup> ‘cut’	H.L
σ	HL	No	a <sup>3</sup> ‘earned’	HL
σ.σ	H.L	No	ki <sup>3</sup> lak <sup>1</sup> ‘tickled’	H.L
σ	M	Yes	a <sup>2</sup> -sI <sup>2</sup> ‘died’	M.M
σ	M	No	aI <sup>2</sup> ‘sewed’	M
σ.σ	M.M	No	a <sup>2</sup> len <sup>2</sup> ‘tied’	M.M
...etc.				

Table 6. Partial classification based on roots

A less unwieldy and more practical approach, however, takes as its starting point the stem patterns shown in the rightmost column, which show a greater similarity to each other than do the roots. In addition, for most of the tonal morphology, verb stems formed from *a*-prefixed roots pattern with those lacking the *a*-prefix. For these reasons, it is more productive to pursue a classification of verbs based on **stems** rather than roots, establishing subclasses as necessary to deal with any tonal behaviour that distinguishes among members of a single stem class.

Accordingly, the following table presents a list of the stem tone patterns:

<i>Tone Pattern</i>	<i>Occurrence</i>
H.L, HL	common
M.M, M	common
L.M	rare
M.H	rare
L.M.M	rare
M.M.M	rare

Table 7. Stem tone patterns

Table 7 seems to indicate the presence of six stem classes, the two most common being those bearing the patterns H(.)L and (M.)M<sup>6</sup>. However, an examination of their tonal behaviour with the addition of suffixal morphology yields three types of verb stems, dividing the (M.)M class in two. This separation into three classes based on tonal morphology is illustrated with the irrealis suffix *-tsɿ* in the following table:

<i>Class</i>	<i>Stem Tone</i>	<i>Irrealis Pattern</i>
1	H(.)L <i>am</i> <sup>31</sup> ‘held’ <i>pi</i> <sup>3</sup> <i>lem</i> <sup>1</sup> ‘thought’	H(.)L-L <i>am</i> <sup>31</sup> - <i>tsɿ</i> <sup>1</sup> ‘hold-IRR’ <i>pi</i> <sup>3</sup> <i>lem</i> <sup>1</sup> - <i>tsɿ</i> <sup>1</sup> ‘think-IRR’
2	(M.)M <i>aɪ</i> <sup>2</sup> ‘sewed’ <i>a</i> <sup>2</sup> - <i>rem</i> <sup>2</sup> ‘buried’	(M.)M-H <i>aɪ</i> <sup>2</sup> - <i>tsɿ</i> <sup>3</sup> ‘sew-IRR’ <i>a</i> <sup>2</sup> - <i>rem</i> <sup>2</sup> - <i>tsɿ</i> <sup>3</sup> ‘bury-IRR’
3	(M.)M <i>phua</i> <sup>2</sup> ‘charmed’ <i>a</i> <sup>2</sup> - <i>tʃep</i> <sup>2</sup> ‘cried’	(H.)H-L <i>phua</i> <sup>3</sup> - <i>tsɿ</i> <sup>1</sup> ‘charm-IRR’ <i>a</i> <sup>3</sup> - <i>tʃep</i> <sup>3</sup> - <i>tsɿ</i> <sup>1</sup> ‘cry-IRR’

Table 8. Stem classes based on tonal behaviour<sup>7</sup>

As Table 8 shows, the two main verb stem patterns can be divided into three classes based on stem tone and suffix tones. The rare<sup>8</sup> stem types from Table 7 also pattern with these major classes, as shown:

<sup>6</sup> The notation H(.)L is meant to indicate both the disyllabic H.L pattern and the monosyllabic HL contour, while (M.)M indicates both disyllabic M.M and monosyllabic M.

<sup>7</sup> In a corpus of ~200 verbs, Class 1 verbs constitute 42%, Class 2 verbs 38%, and Class 3 verbs 19%.

<sup>8</sup> “Rare” meaning 1-3 tokens of each.

<i>Stem Tone</i>	<i>Irrealis Pattern</i>	<i>Class</i>
L.M	L.M-H	2
L.M.M	L.M.M-H	2
M.M.M	M.M.M-H	2
M.H	M.H-L	3

Table 9. Rare stem type patterning

With these verb stem classes established, the following sections examine each class from an autosegmental perspective, presenting explanations for tonal behaviour manifested in the context of various verbal suffixes.

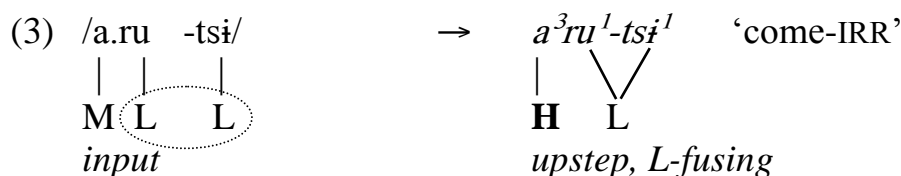
#### 4.2.1. Class 1 (H.L, HL)

Class 1 verb stems, bearing disyllabic H.L patterns and monosyllabic HL contours, consist of two major types: stems formed by *a*-prefixed roots, and stems lacking the *a*-prefix. Both types can be analysed as bearing an underlying M.L/ML tone combination, which surfaces as H.L/HL as a result of upstep:

<i>Stem Prefix</i>	<i>Underlying Form</i>	<i>Surface Form</i>
<i>a</i> -prefix	M-L /a <sup>M</sup> -lep <sup>L</sup> /	H-L a <sup>3</sup> -lep <sup>1</sup> ‘cut’
none	M(.)L /a <sup>M</sup> ru <sup>L</sup> / /tsik <sup>ML</sup> /	H(.)L a <sup>3</sup> ru <sup>1</sup> ‘came’ tsik <sup>31</sup> ‘fell’

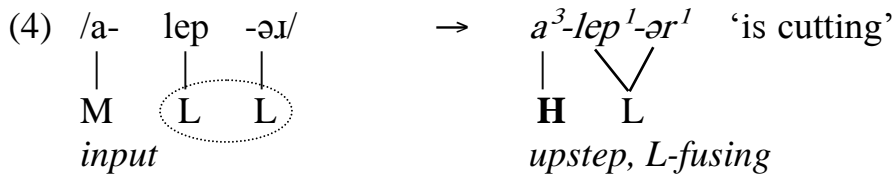
Table 10. Class 1 stem subtypes based on *a*-prefix

Upstep of the M tone on the stem, simple tone concatenation with the suffix, and fusing of the two L tones (to satisfy the OCP) occurs upon suffixation of the irrealis /-tsi<sup>L</sup>/ or present<sup>9</sup> /-ɹɪ<sup>L</sup>/, which are both assumed to bear an underlying L tone. This process is illustrated in examples (3) and (4) below<sup>10</sup>:



<sup>9</sup> The present suffix could also be represented as the syllabic consonant /-ɹ<sup>L</sup>/.

<sup>10</sup> An upstepped tone is represented by a boldfaced **H** in the examples throughout this paper.



The tonal behaviour of Class 1 is more complex with concatenation of the immediate-present suffix  $/\text{-tar}^{\text{ML}}/$ , imperative  $/\text{-aŋ}^{\text{M}}/$ , or present-perfect  $/\text{-u}^{\text{H}}\text{ku}^{\text{M}}/$ . While  $/\text{-u}^{\text{H}}\text{ku}^{\text{M}}/$  (which contains an underlying H) and  $/\text{-aŋ}^{\text{M}}/$  surface unchanged as  $-\text{u}^3\text{ku}^2$  and  $-\text{aŋ}^2$ , the M tone of  $/\text{-tar}^{\text{ML}}/$  undergoes upstep to yield  $-\text{tar}^{31}$ , bearing a HL contour<sup>11</sup>. In addition, these three suffixes trigger loss of the *a*-prefix, and also cause the stem to undergo various tonal alternations. The Class 1 verb stems can be generally categorized into three subclasses of tonal behaviour with respect to these suffixes:

<i>Stem Tone with presence of suffix:</i>				
<i>Subclass</i>	<i>Stem Prefix</i>	$/\text{-tar}^{\text{ML}}/$ (IMMED.PRES)	$/\text{-aŋ}^{\text{M}}/$ (IMPER)	$/\text{-u}^{\text{H}}\text{ku}^{\text{M}}/$ (PRES.PERF)
A	none e.g. $/\text{in}^{\text{M}}\text{jak}^{\text{L}}/$	H(.)L / H(.)M $\text{in}^3\text{jak}^1\text{-tar}^{31}$ 'is now working'	H(.)L / H(.)M $\text{in}^3\text{jak}^1\text{-aŋ}^2$ 'work!'	H(.)L / H(.)M $\text{in}^3\text{jak}^1\text{-u}^3\text{ku}^2$ 'has worked'
B	none e.g. $/\text{pi}^{\text{M}}\text{lem}^{\text{L}}/$	L.L $\text{pi}^1\text{lem}^1\text{-tar}^{31}$ 'is now thinking'	L.L $\text{pi}^1\text{lem}^1\text{-aŋ}^2$ 'think!'	L.M $\text{pi}^1\text{lem}^2\text{-u}^3\text{ku}^2$ 'has thought'
C	<i>a</i> -prefix e.g. $/\text{a}^{\text{M}}\text{-zik}^{\text{L}}/$	M $-\text{zik}^2\text{-tar}^{31}$ 'is now hitting'	M $-\text{zik}^2\text{-aŋ}^2$ 'hit!'	M $-\text{zik}^2\text{-u}^3\text{ku}^2$ 'has hit'

Table 11. Class 1 stem subclasses

As seen in Table 11, Subclass A exhibits the most “expected” behaviour, as the stems maintain their H(.)L patterns/contours under suffixation, though the stem-final L may be phonetically pulled up to M next to a suffixal M or H.

Stems in Subclass B inexplicably adopt a L.L pattern upon concatenation of these suffixes. (The M tone in the L.M pattern of the third column may be a phonetic result of adjacency to the /u/ in  $/\text{-u}^{\text{H}}\text{ku}^{\text{M}}/$ , which bears an underlying H tone.)

Finally, the *a*-prefixed stems of Subclass C lose their prefixes, and the resulting monosyllabic stems are realized as M upon suffixation.

In the author’s view, the autosegmental framework is not helpful in capturing these stem tone alternations, a phenomenon which seems to have no good explanation beyond a simple delineation of subclasses.

<sup>11</sup> Note that  $/\text{-tar}^{\text{ML}}/$  always undergoes upstep to surface as  $-\text{tar}^{31}$ , irrespective of the verb stem to which it is attached.



## 4.2.2. Class 2 (M.M, M)

Class 2 verb stems, bearing disyllabic M.M or monosyllabic M, are more uniform than Class 1 in their tonal behaviour under suffixation, exhibiting no stem tone alternations.

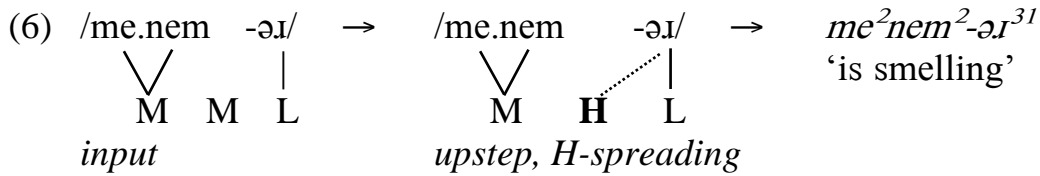
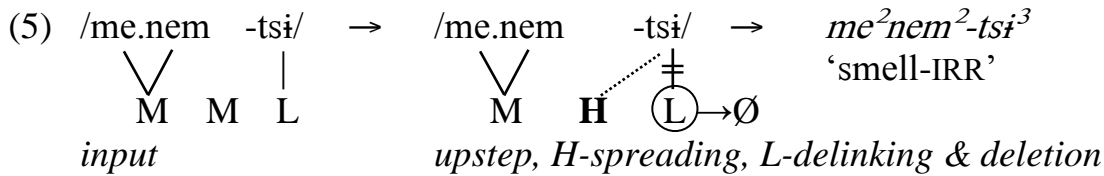
However, while the  $/-taɪ^{ML}/$ ,  $/-aŋ^M/$ , and  $/-u^Hku^M/$  suffixes surface as expected ( $-tar^{31}$ ,  $-aŋ^2$ , and  $-u^3ku^2$ ), the irrealis  $/-tsɿ^L/$  and present  $/-əɪ^L/$  suffixes exhibit different surface tones than those observed in concatenation with Class 1 stems. Instead of both bearing a single L tone, the irrealis bears H and the present bears a HL contour when suffixed to Class 2 stems. The following table illustrates the surface tones of each suffix:

<i>Underlying Suffix</i>	<i>Surface Tone</i>	<i>Example: /a<sup>M</sup>-lem<sup>M</sup>/</i>
$/-taɪ^{ML}/$ (IMMED.PRES)	HL (upstep)	$-lem^2-tar^{31}$ 'is now handing out'
$/-aŋ^M/$ (IMPER)	M	$-lem^2-aŋ^2$ 'hand out!'
$/-u^Hku^M/$ (PRES.PERF)	H.M	$-lem^2-u^3ku^2$ 'has handed out'
$/-tsɿ^L/$ (IRR)	H	$a^2-lem^2-tsɿ^3$ 'hand out-IRR'
$/-əɪ^L/$ (PRES)	HL	$a^2-lem^2-əɪ^{31}$ 'is handing out'

Table 12. Suffix tones with Class 2 stems

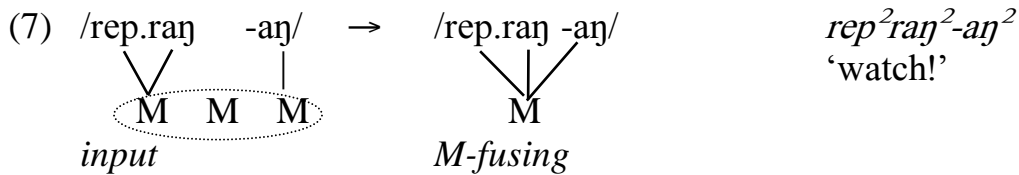
If the irrealis and present suffixes indeed both bear underlying L, as assumed in the previous section, then the manifestation of a H tone and HL contour on their surface forms, respectively, is good evidence for the existence of a floating H tone to the right of all Class 2 verb stems. This floating H could delink the L of  $/-tsɿ^L/$  to yield  $-tsɿ^3$  but combine with the L of  $/-əɪ^L/$  to form  $-əɪ^{31}$ .

The problem with such an analysis is that it cannot explain what happens to this alleged floating H when the verb stem is suffixed with the imperative  $/-aŋ^M/$ , surfacing as (M.)M-M with no H in sight (e.g.  $rep^2raŋ^2-aŋ^2$  'watch!'). For this reason, it is preferable to treat the floating tone accompanying Class 2 verb stems as M, which is upstepped to H before the L of  $/-tsɿ^L/$  and  $/-əɪ^L/$ . This process is illustrated in the following examples:

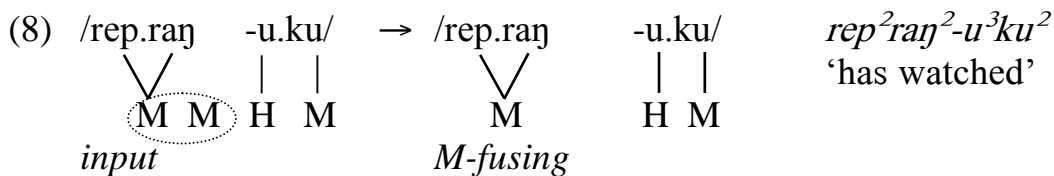


It is important to note that this analysis assumes upstep occurs before OCP-motivated fusing of tones, otherwise the floating M would combine with the linked M of the verb stem before it could be upstepped to H. In addition, the delinking of L from  $/-tsi^L/$  in (5) (rather than the formation of a HL contour) is likely due to a restriction that derived contours be linked to a syllable that is minimally bimoraic<sup>12</sup>, thus prohibiting  $-tsi^{31}$ .

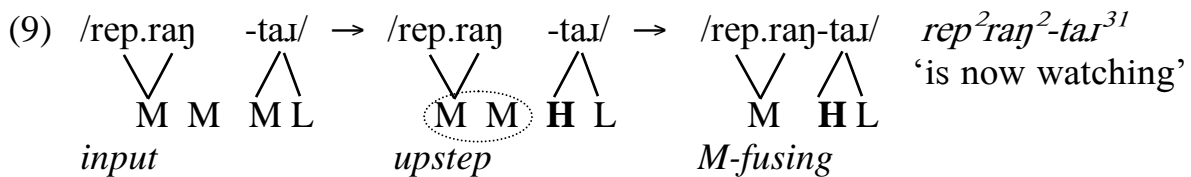
When a Class 2 verb stem is concatenated with the imperative suffix  $/-aŋ^M/$ , the floating M is simply fused with the underlying M tones of the stem and  $/-aŋ^M/$ :



When the verb stem is concatenated with present-perfect  $/-u^Hku^M/$ , the floating M cannot delink the suffixal H, and consequently fuses with the stem tone:

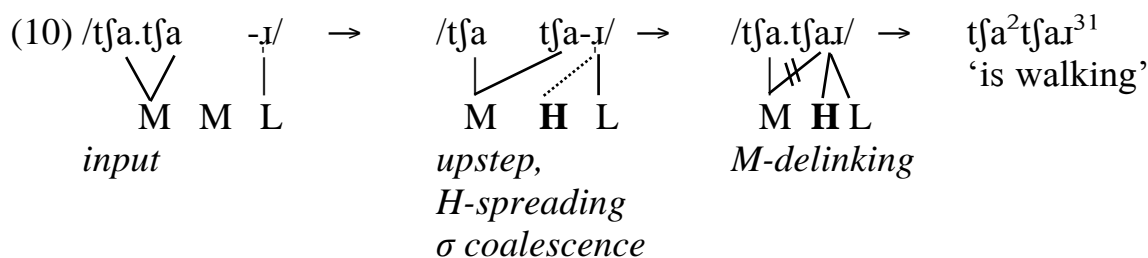


When the suffix is the immediate-present  $/-taɪ^{ML}/$ , the M tone of the suffix first undergoes upstep to H, after which the floating M fuses with the stem:



<sup>12</sup> If the monomorphemic verb  $a^{31}$  ‘earned’ can be shown to contain a long vowel ( $aa^{31}$ ), it may be the case that this restriction applies to underlying contours as well.

Finally, if a M.M verb stem ends in a vowel or glottal stop, the final syllable of the stem merges with the present suffix  $/-\text{ɬ}^L/$  to yield M.HL. For this reason, it is sometimes helpful to treat the present suffix as a syllabic  $/\text{ɬ}/$ , namely  $/-\text{ɬ}^L/$ :



In the above example, the coalescing  $/\text{tʃa}/$  must delink from the stem M tone because  $/\text{ɬ}^L/$  already bears a contour and the resultant  $\text{tʃa}\text{ɬ}^L$  syllable cannot hold another tone. (No single Chungli Ao syllable exhibits a three-level tone contour.)

#### 4.2.3. Class 3 (M.M, M ~ H.H, H)

##### 4.2.3.1. Irrealis and present forms

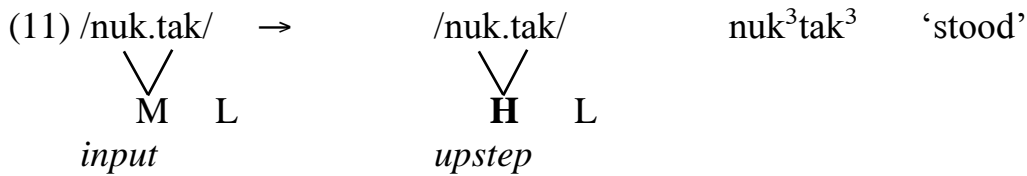
Class 3 verb stems, like Class 2, also bear (M.)M tone, but differ from Class 2 in the (H.)H tone pattern that surfaces on stems concatenated with the irrealis  $/-\text{tsi}^L/$  and present  $/-\text{ɬ}^L/$  suffixes:

Suffix	Stem Tone (suffixed)	Example: $/\text{a}^M\text{len}^M/$
$/-\text{tsi}^L/$ (IRR)	(H.)H	$\text{a}^3\text{len}^3\text{-tsi}^1$ ‘tie-IRR’
$/-\text{ɬ}^L/$ (PRES)	(H.)H	$\text{a}^3\text{len}^3\text{-}\text{ɬ}^1$ ‘is tying’

Table 13. Class 3 stem tones for IRR & PRES

Before positing an explanation for this behaviour, it should be noted that there is considerable variability in the tonal expression of the **bare stem** itself. For a number of Class 3 verbs, our consultant varies in producing (M.)M or (H.)H for the preterite form<sup>13</sup>. There are at least two possible explanations for this variability. The first involves proposing the existence of a floating L tone following the verb stem, which has the effect of upstepping the preceding M tone on the stem, as illustrated below:

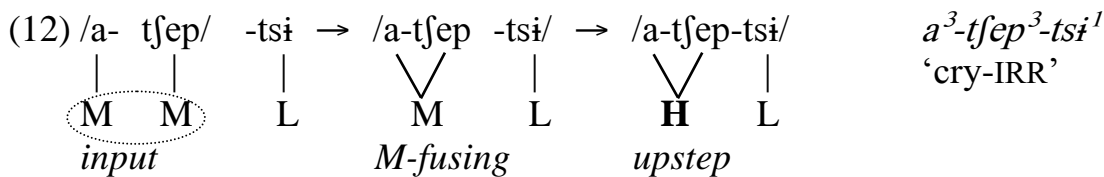
<sup>13</sup> Recall that the preterite form is identical to the bare stem.



The problem with this approach is that there exist Class 3 preterite forms for which our consultant refuses to accept a (H.)H pattern. If Class 3 stems are followed by a floating L, then upstep of the stem tone should at least be **allowed**, even if the process is not always automatically triggered. In addition, a floating L is problematic for analysing the interaction of Class 3 stems with the /-taɪ<sup>ML</sup>/, /-aŋ<sup>M</sup>/, and /-u<sup>H</sup>ku<sup>M</sup>/ suffixes, which surface as expected and show no evidence of downstep (which would be triggered by a preceding floating L)<sup>14</sup>.

The alternative explanation for the existence of this (M.)M/(H.)H preterite variability appeals to the fact that the stems of the present and irrealis forms both bear (H.)H, as shown in Table 13. Since the present is the preferred form for describing both present and habitual actions, and the irrealis is used for future actions, the frequency of occurrence for these verb forms in natural speech is likely quite high. It is therefore possible that a process of analogy is currently taking place in Chungli Ao whereby the preterite (= bare stem) is conforming to the stem of the irrealis and present forms.

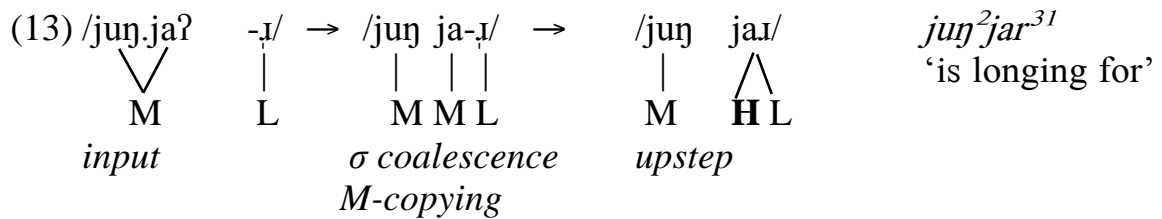
Returning to the question of why the irrealis and present stems surface as (H.)H in the first place, this is likely a result of upstep triggered by the suffixal L, as illustrated below. (Note that, for *a*-prefixed stems such as *a-tʃep* below, this analysis requires an initial stem-level cycle in which M on the *a*-prefix fuses with M on the root, in order that both syllables of the stem can subsequently undergo upstep<sup>15</sup>.)



The tonological process depicted for the irrealis /-tsi<sup>L</sup>/ in (12) is identical to that for the present /-əɪ<sup>L</sup>/, with the following exception: If a Class 3 verb stems ends in a vowel or glottal stop, the final syllable of the stem merges with the present suffix /-əɪ<sup>L</sup>/ (or /-ɪ<sup>L</sup>/) to yield the tone pattern M.HL:

<sup>14</sup> One could potentially answer this second objection by proposing that the floating L is simply the past suffix, namely /-<sup>L</sup>/.

<sup>15</sup> This ordering of [fusing (stem) → upstep → fusing (word)] does not conflict with the order proposed in Section 4.2.2 (p.10) for Class 2 verbs, if one stipulates that the stem-level fuse operation affects only tones linked to segments, leaving floating tones alone.



This is similar to the process for Class 2 stems shown in example (10). However, in (13), the final stem syllable /jaʔ/ must **copy** its linked M tone when it coalesces with the suffix, because a single tone cannot serve as both a level tone in one syllable and the first half of a contour in the following syllable (as would be the case if the stem M tone were linked to both /juŋ/ and /jaɿ/)<sup>16</sup>.

To further complicate the situation in Class 3, it should be noted that some of the irrealis forms show variability between (M.)M-L and (H.)H-L (essentially, the absence or presence of upstep). According to our consultant, whether an irrealis form is produced as (M.)M-L and (H.)H-L can depend on the village from which the speaker hails. In his own speech, however, this alternation is related to the final tone of an immediately preceding word: If an irrealis form is of the type to show such variability<sup>17</sup>, the (M.)M-L form appears after a L syllable (14), while the (H.)H-L form appears after a M syllable (15):

(14) M	L	M.M-L
pai <sup>2</sup>	tʃi <sup>1</sup>	me <sup>2</sup> tʃak <sup>2</sup> -tsi <sup>1</sup>
3SG.M	rice	chew-IRR
‘He will chew rice.’		

(15) M	M.M	H.H-L
pai <sup>2</sup>	me <sup>2</sup> nti <sup>2</sup>	me <sup>3</sup> tʃak <sup>3</sup> -tsi <sup>1</sup>
3SG.M	corn	chew-IRR
‘He will chew corn.’		

This correlation suggests that the process of upstep is triggered by the need to show tonal contrast. In (14), the M.M tone pattern on the stem of ‘chew-IRR’ is sufficiently higher than the preceding L on ‘rice’ to differentiate them, whereas upstep must apply on the verb stem in (15) to distinguish its tone from the preceding M.M on ‘corn’.

#### 4.2.3.2. Immediate-present, imperative, and present-perfect forms

Suffixation of the immediate-present /-taɿ<sup>ML</sup>/ or the present-perfect /-u<sup>H</sup>ku<sup>M</sup>/ to a Class 3 verb stem simply involves tone concatenation (with the exception of the expected upstep on /-taɿ<sup>ML</sup>/ that yields -taɿ<sup>31</sup>). This is shown in Table 14. (Recall that /-taɿ<sup>ML</sup>/ and /-u<sup>H</sup>ku<sup>M</sup>/ trigger loss of the *a*-prefix.)

<sup>16</sup> Admittedly, this is a tentative stipulation in need of verification.

<sup>17</sup> Some Class 3 irrealis forms are invariably H.H-L.

<i>Suffix</i>	<i>Stem Tone (suffixed)</i>	<i>Example: /a<sup>M</sup>-tʃep<sup>M</sup>/</i>
/-taɾ <sup>ML</sup> /	(M.)M	-tʃep <sup>2</sup> -taɾ <sup>31</sup> 'is now crying'
/-u <sup>H</sup> ku <sup>M</sup> /	(M.)M	-tʃep <sup>2</sup> -u <sup>3</sup> ku <sup>2</sup> 'has cried'

Table 14. Class 3 stem tones for IMMED.PRES & PRES.PERF

Under suffixation of the imperative /-aŋ<sup>M</sup>/, however, the Class 3 verb stems fall into three tonal subclasses:

<i>Subclass</i>	<i>Stem Tone (suffixed)</i>	<i>Example</i>
A	(M.)M	me <sup>2</sup> rək <sup>2</sup> -aŋ <sup>2</sup> 'clean!' -tʃep <sup>2</sup> -aŋ <sup>2</sup> 'cry!'
B	H.H	laŋ <sup>3</sup> zi <sup>3</sup> -aŋ <sup>2</sup> 'answer!'
C	L.M	a <sup>1</sup> tsik <sup>2</sup> -aŋ <sup>2</sup> 'hide!'

Table 15. Class 3 stem subclasses under IMPERATIVE suffixation

Subclass A exhibits the “expected” behaviour, as all underlying tones surface unchanged as (M.)M-M. It is possible that the H.H subclass B is part of the analogical process posited in the previous section, in which some Class 3 verb stems are being altered from (M.)M to (H.)H. Of the three subclasses, Subclass C is only one whose tonal behaviour does not yield an explanation up front.

## 5. LACUNAE & CONCLUSION

As mentioned before, this investigation was not meant to be exhaustive. The tonal behaviour of many aspects of Chungli Ao verbal morphology was excluded, including that of prefixes, lexical suffixes, derivational suffixes, modals, converb suffixes, and multiple-suffix combinations. Some of these items appear to fall neatly into the account given here, while others may require modification of the analysis or adoption of a different theoretical framework, such as that of Cophonologies (cf. Inkelas & Zoll 2007). Moreover, additional verb stem subclasses may be uncovered if the exceptional items are found to be more numerous under further investigation.

A summary table of the tonal alternations described in this paper is included in the Appendix.

## REFERENCES

Avery, John. 1886. The Ao Naga language of southern Assam. *The American Journal of Philology* 7(3).344-366.

- Burling, Robbins. 2003. The Tibeto-Burman Languages of Northeastern India. In Graham Thurgood and Randy J. LaPolla (eds.), *The Sino-Tibetan Languages*, 169-191. London, New York: Routledge.
- Clark, Mrs. E. W. [Mary M. Clark]. 1893. *Ao Naga grammar with illustrative phrases and vocabulary*. Shillong: Assam Secretariat Printing Department.
- Clark, E. W. 1911. *Ao-Naga dictionary*. Calcutta: Baptist Mission Press.
- Coupe, A. R. 2003. *A phonetic and phonological description of Ao: A Tibeto-Burman language of Nagaland, north-east India*. Canberra: Pacific Linguistics.
- Coupe, A. R. 2007. *A grammar of Mongsen Ao*. Berlin, New York: Mouton de Gruyter.
- Coupe, A. R. 2008. Transitivity in Ao and other languages of Nagaland. Paper presented at the Local Workshop on Transitivity, RCLT, La Trobe University, October 30, 2008.
- Goldsmith, John. 1976a. *Autosegmental phonology*. Cambridge, MA: Massachusetts Institute of Technology Ph.D. dissertation.
- Goldsmith, John. 1976b. An overview of autosegmental phonology. *Linguistic Analysis* 2.23-68.
- Gowda, K. S. Gurubasave. 1972. *Ao-Naga phonetic reader*. Mysore: Central Institute of Indian Languages.
- Gowda, K. S. Gurubasave. 1975. *Ao grammar*. Mysore: Central Institute of Indian Languages.
- Hyman, Larry M. 2001. Privative tone in Bantu. In Shigeki Kaji (ed.), *Cross-linguistic studies of tonal phenomena: Tonogenesis, Japanese accentology, and other topics*, 237-257. Tokyo: Institute for the Study of Languages and Cultures.
- Hyman, Larry M. 2007. Kuki-Thaadow: An African tone system in Southeast Asia. *UC Berkeley Phonology Lab Annual Report* (2007), [http://linguistics.berkeley.edu/phonlab/annual\\_report/documents/2007/Hyman\\_KT\\_Tone\\_PL\\_Annual.pdf](http://linguistics.berkeley.edu/phonlab/annual_report/documents/2007/Hyman_KT_Tone_PL_Annual.pdf).
- Inkelas, Sharon & Cheryl Zoll. 2007. Is grammar dependence real? A comparison between cophonological and indexed constraint approaches to morphologically conditioned phonology. *Linguistics* 45.133-171.
- Matisoff, James A. 2003. *Handbook of Proto-Tibeto-Burman: System and philosophy of Sino-Tibetan reconstruction*. Berkeley, Los Angeles: University of California Press.
- Rhodes, Russell. 2009. *Lexical Tone in Chungli Ao*. Berkeley, CA: Unpublished UC Berkeley ms.
- Thomas, Elaine. 1974. Engenni. In John Bendor-Samuel (ed.), *Ten Nigerian tone systems*, 13-26. Jos, Kano, Nigeria: Institute of Linguistics & Centre for the Study of Nigerian Languages.
- Thomas, Elaine. 1978. *A grammatical description of the Engenni language*. Arlington, TX: University of Texas at Arlington and Summer Institute of Linguistics.

## APPENDIX

The following table summarizes the tonal behaviour of each stem tone class. Periods represent syllable boundaries, while dashes indicate stem-suffix boundaries. Slashes separate alternate tonal manifestations within the same (sub)class:

<i>Form</i>	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>
Bare Stem (preterite)	H(.)L	(M.)M	(M.)M / (H.)H
+ /-tsi <sup>L</sup> / (IRR)	H(.)L-L	(M.)M-H	(M.)M-L / (H.)H-L
+ /-əɹ <sup>L</sup> / (PRES)	H(.)L-L	(M.)M-HL / M.HL	(H.)H-L / M.HL
+ /-taɹ <sup>ML</sup> / (IMMED.PRES)	Subcl. A: H(.)L-HL / H(.)M-HL Subcl. B: L.L-HL Subcl. C: M-HL	(M.)M-HL	(M.)M-HL
+ /-aŋ <sup>M</sup> / (IMPER)	Subcl. A: H(.)L-M / H(.)M-M Subcl. B: L.L-M Subcl. C: M-M	(M.)M-M	Subcl. A: (M.)M-M Subcl. B: H.H-M Subcl. C: L.M-M
+ /-u <sup>H</sup> ku <sup>M</sup> / (PRES.PERF)	Subcl. A: H(.)L-H.M / H(.)M-H.M Subcl. B: L.M-H.M Subcl. C: M-H.M	(M.)M-H.M	(M.)M-H.M

Table 16. Summary of Chungli Ao verb stem classes