

# Verbal Tone in Buli: a Morphosyntactic Analysis<sup>□</sup>

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In languages where tone or accent is lexically contrastive there is often an asymmetry in the lexical categories that display the contrast. Typically roots have a greater range of distinctions than affixes. Within roots nominals often make more distinctions than verbs. For example, in both Spanish and Italian nominals contrast the location of stress within the three-syllable window at the right edge of the word. Italian retains this contrast in verbal inflection (cf. *m'acin-a* 'grinds' vs. *lav'or-a* 'works') while it has been lost in Spanish. For pitch accent systems, Tokyo Japanese verbs lack the contrasts for accent location found in nouns while retaining the accented vs. unaccented lexical contrast. In the Fukuoka dialect (Smith 1999) verbs fall uniformly in the accented class (realized on the syllable containing the penultimate mora). Similar asymmetries are found in the Bantu languages. In many of these languages the absence of lexical contrasts in the verb is compensated by complex accentual and tonal alternations as a function of the tense/aspect of the verb. These cases are particularly challenging analytically because often the underlying morphological structure is not clear and hence there is no direct connection between accentual/tonal location and tense-aspect exponence.

In this paper we look at another example of this phenomenon--this time from a language with a richer inventory of lexical tonal contrasts. We will argue that rather than invoking rules of allomorphy, inflectional tone is best treated as the reflex of preverbal particles that, lacking any segmental exponence, find their tones realized on the following verb. In this analysis the tonal patterns on the verb are thus a reflection of tonal particles that are the true exponence of the tense/aspect distinction. As we shall see, the burden of describing the tonal patterns on the verb is borne primarily by morphosyntactic rules that control the distribution of the tonal particles. Tonal particles are familiar to many of us from the associative construction in many West African languages where the pivot morpheme in Noun of Noun phrases is often just a tone that is realized on an adjacent noun or otherwise makes its presence felt (e.g. through downstep). More directly pertinent to our case, Elsa Gomez-Imbert (1997, 2002) has documented a striking precursor of the phenomenon in Barasana where inflectional prefixes marking subject agreement have lost their segmental exponence forcing their tones to associate with the following verb, where they displace the verb's original tone further to the right.

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Our language is Buli, a Gur language of Northern Ghana. The analysis is based on previous collaboration with George Akanlig-Pare, a native speaker linguist of the Central dialect (Akanlig-Pare & Kenstowicz 2002, 2003; Akanlig-Pare forthcoming). This presentation is divided into three parts. After a brief review of the language's general tonology, we survey the tone patterns in the verbal inflection, developing our analysis along the way. We then turn to the patterns of verbal tone found in several grammatical contexts: serial verbs, subordinate clauses, and reduplicative constructions.

## 1. Background

Buli nouns and adjectives (argued to be a subset of nominals by Matushansky 2002) as well as particles contrast for three tonal levels: High, Mid, and Low.

(1)	s <sup>y</sup> úk	path	s <sup>y</sup> ūk	navel	s <sup>y</sup> ùk	fish sp
	fí:k	small	pjēlūk	'white'	wòŋ	'large'
	ká	focus	sī	'if'	tì	subject relative complementizer

The syllable is the tone-bearing unit in Buli. The language has two very general tonal processes illustrated in (2a). The first spreads a L tone to a syllable with a following H to create a Rising tone (2). If that Rising tone itself occurs before another H then it is simplified to L by deletion of its H component (2b).

(2)	a.	bí:k	child	wà bǐ:k	his child
		f í:k	small	bàŋ f ǐ:k	a small lizard
	b.	wà bǐ:k	his child	wà bǐ f í:k	his small child
		bí màŋ	good child	wà bǐ màŋ	his good child

We state these rules in (3).

(3)	□	□	□	□
			/\	
	L	H	L <del>H</del>	H

The derivations in (4) illustrate how these two rules apply.

(4)	/wà bí:k/	/wa bí fí:k/	
	wà bǐ:k	wà bǐ fí:k	Low Tone Spread
	-----	wà bǐ fí:k	Rising Tone Absorption

In order to discern the underlying tonal patterns in the verbal inflection, the effects of Low Tone Spread and Rising Tone Absorption must be undone.

## 2. Verbal Inflection

Verbs in Buli do not contrast lexically for tone. For example, when adjectives are turned into stative verbs, their tones are replaced with mid neutralizing tonal contrasts: cf. *wòŋ* 'tall', *wōn-ā* 'is tall'; *nālēŋ* 'nice', *nāl-ā* 'is nice'). This property is shared by Konni--Buli's close neighbor (see Cahill 1999) and appears to be an innovation. Other Gur languages such as Dagare (Bodomo 1997) have lexical tone contrasts on the verb. Buli is an SVO language. Subject pronouns are Low in tone. Direct-object pronouns are enclitic to the verb and alternate in tone as a function of the tense/aspect inflectional particles that precede the verb.

Let us preview our analysis. The verb's tone alternates between HL and L in certain tenses and is Mid otherwise. Mid is pretty clearly the default tone. HL is the reflex of an Inflectional particle whose semantic contribution to the utterance is varied. It has the flavor of a "force" morpheme. This particle is restricted to main clauses. When added to certain tenses it imparts an emphatic sense to the verb. In other tenses it is part of the normal inflection. But whether its tones appear on the verb depends on what other particles accompany it in the INFL position. Three different realizations of this morpheme will be discussed. First, it is systematically missing after third person subjects. But when another morpheme intervenes between it and the subject, then its deletion is blocked. Finally, it can be attracted to a "heavy" verb: one with a cliticized direct object. We now turn to an illustration of these points and develop the analysis along the way.

In (5) we show the inflection in the perfect tense for the intransitive verb [la] 'laugh' and the transitive [nag] 'hit'. Verbal roots are underlyingly monosyllabic. When they end in a consonant they are normally followed by an epenthetic vowel that copies the tone of the preceding syllable. For certain complications see Akanlig-Pare & Kenstowicz (2002).

(5)	̀̀  ǎ	I laughed	̀̀  ǎ	we laughed
	f̀̀  ǎ	you laughed	ǹ̀  ǎ	you pl. laughed
	wà  ǎ	he laughed	bà  ǎ	they laughed
	̀̀  ̀̀gí	I hit	̀̀  ̀̀gí	we hit
	f̀̀  ̀̀gí	you hit	ǹ̀  ̀̀gí	you pl. hit
	wà  ̀̀gĩ	he hit	bà  ̀̀gĩ	they hit

Recalling the rules of Low Tone Spread and Rising Tone Absorption, it is clear that the verb has an underlying High tone in the first and second person but a Low in third person. In (6) we see the perfect of [nag] accompanied by the cliticized direct object *-wa*. Once again a different tonal contour emerges as a function of the subject. In first and second person the verb has an underlying H and a L appears on the object suffix. But in the third person, the verb is Low and the object suffix is Mid.

- |     |               |             |               |                 |
|-----|---------------|-------------|---------------|-----------------|
| (6) | ̀̀ n`n`g`-w`  | ɪ hit him   | ɥ` n`g`-w`    | we hit him      |
|     | f` ̀̀ n`g`-w` | you hit him | n` ̀̀ n`g`-w` | you pl. hit him |
|     | w` n`g`-w`    | he hit him  | b` n`g`-w`    | they hit him    |

Our analysis of these data runs as follows (7). We postulate a morpheme (call it Agr) consisting of HL followed by a Tns-Asp L tone. Lacking any segmental material to support its tones, the INFL node's HL maps to the verb pushing aside the L Tns-Asp morpheme. When the subject is third person, we postulate a morphosyntactic rule that deletes the Agr morpheme. The L of Tns-Asp remains and it maps to the verb. The object suffix then receives a default Mid.

- (7) [Agr Tns]<sub>INFL</sub> Verb  
 HL L
- AGR → ∅ / [-participant] \_\_\_\_\_
- default: ∅ → M

The derivations in (8) illustrate the proposed analysis.

- (8) a. morphosyntax
- |    |  |        |              |
|----|--|--------|--------------|
| w` | [HL] <sub>Agr</sub> [L] <sub>Tns</sub> | nag-wa | underlying   |
| w` | [L] <sub>Tns</sub>                     | nag-wa | Agr Deletion |
- phonology
- |              |                    |                  |
|--------------|--------------------|------------------|
| w`           | nag-wa             | Tone Association |
|              | [L] <sub>Tns</sub> |                  |
| w`           | n`g`-w`            | Default Mid      |
| w`           | n`g`-w`            | Epenthesis       |
| w` n`g`-w`   |                    | output           |
| 'he hit him' |                    |                  |
- b. morphosyntax
- |       |  |        |              |
|-------|--|--------|--------------|
| f` ̀̀ | [HL] <sub>Agr</sub> [L] <sub>Tns</sub> | nag-wa | underlying   |
|       | inapplicable                           |        | Agr Deletion |

<u>phonology</u>		
f ì	nag-wa	Tone Association
	[HL] <sub>Agr</sub> [L] <sub>Tns</sub>	
f î	náǵí-wà	Epenthesis
fǐ nǎǵí-wà		Low Tone Spread
fǐ nàǵí-wà		Rising Tone Absorption
'you hit him'		

Given this general analytic scheme, consider now in (9) the corresponding negatives marked by *àn*. The alternation between first and second vs. third person is leveled out. A reflex of the HL Agr appears on all forms of the verb. The intransitive [la] 'laugh' takes the factitive [ya] which appears in the slot where clitics occur.

(9)	màn lǎ-yà	'I did not laugh'	ǐ àn lǎ-yà	'we did not laugh'
	fǐ àn lǎ-yà	'you did not laugh'	nǐ àn lǎ-yà	'you pl. did not laugh'
	wà àn lǎ-yà	'he did not laugh'	bà àn lǎ-yà	'they did not laugh'

The simplest analysis is that the negative particle *àn* intervenes between the HL Agr and the subject blocking the rule of Agr deletion.

(10)	<u>morphosyntax</u>		
	wà àn	[HL] <sub>Agr</sub> [L] <sub>Tns</sub> nag-wa	underlying
		inapplicable	Agr Deletion
	<u>phonology</u>		
	wà àn	nag-wa	Tone Association
		[HL] <sub>Agr</sub> [L] <sub>Tns</sub>	
	wà àn	náǵí-wà	Epenthesis
	wà àn nǎǵí-wà		Low Tone Spread
	wà àn nàǵí-wà		Rising Tone Absorption
	'he did not hit him'		

Now consider stative verbs. They lack any INFL node marking tense/aspect and hence receive a default Mid (11).

(11)	mí nāl-ā	'I emph. am nice'	ǐ nāl-ā	'we are nice'
	fǐ nāl-ā	'you are nice'	nǐ nāl-ā	'you pl. are nice'
	wà nāl-ā	'he is nice'	bà nāl-ā	'they are nice'

But when an emphatic sense is intended then the stative shows the HL falling contour (12). However, this tonal contour cannot occur in the third person, where no contrast between a

plain and emphatic sense is possible. This of course is precisely the distribution of the Agr morpheme in the perfect seen in (5) and (6).

- |      |          |                |          |                    |
|------|----------|----------------|----------|--------------------|
| (12) | ̀̀ nǎl-à | ‘I am nice’    | ̀̀ ǎl-à  | ‘we are nice’      |
|      | fǐ nǎl-à | ‘you are nice’ | nǐ nǎl-à | ‘you pl. are nice’ |
|      | wà nāl-ā | ‘he is nice’   | bà nāl-ā | ‘they are nice’    |

The parallel is strengthened when we look at the corresponding negatives. Under the nonemphatic reading the stative verb retains the mid tone. But under emphasis the HL is leveled through the paradigm--just as in the perfect.

- |      |             |                       |             |                        |
|------|-------------|-----------------------|-------------|------------------------|
| (13) | mí àn nāl-ā | ‘I emph. am not nice’ | ̀̀ ǎn nāl-ā | ‘we are not nice’      |
|      | fǐ àn nāl-ā | ‘you are not nice’    | nǐ àn nāl-ā | ‘you pl. are not nice’ |
|      | wà àn nāl-ā | ‘he is not nice’      | bà àn nāl-ā | ‘they are not nice’    |
|      | mà:n nǎl-à  | ‘I am not nice’       | ̀̀ ǎn nǎl-à | ‘we are not nice’      |
|      | fǐ àn nǎl-à | ‘you are not nice’    | nǐ àn nǎl-à | ‘you pl. are not nice’ |
|      | wà àn nǎl-à | ‘he is not nice’      | bà àn nǎl-à | ‘they are not nice’    |

It thus appears that the HL Agr morpheme--normally absent from stative verbs due to morphological impoverishment--can be inserted for emphasis--a striking analogue to the famous *do*-support phenomenon in English: cf. *I like it* vs. *I do like it*.

- |      |   |                     |                                |
|------|---|---------------------|--------------------------------|
| (14) | <u>morphosyntax</u>                             |                     |                                |
|      | fǐ [HL] <sub>Agr</sub> [L] <sub>Tns</sub> nal-a |                     | underlying                     |
|      | fǐ nal-a  |                     | Infl Deletion (Impoverishment) |
|      | <u>phonology</u>                                |                     |                                |
|      | fǐ nāl-ā  |                     | Default Mid                    |
|      | ‘you are nice’                                  |                     |                                |
|      | <u>morphosyntax</u>                             |                     |                                |
|      | fǐ [HL] <sub>Agr</sub> [L] <sub>Tns</sub> nal-a |                     | underlying                     |
|      | blocked under emphasis                          |                     | Infl Deletion                  |
|      | <u>phonology</u>                                |                     |                                |
|      | fǐ nal-a  |                     | Tone Association               |
|      |   | [HL] <sub>Agr</sub> |                                |
|      | fǐ nǎl-à  |                     | Low Tone Spread                |
|      | ‘you are nice’                                  |                     |                                |

Imperative verbs show a similar impoverished inflection. The verb has default mid (15a). When negated (15b), the imperative takes a different Neg morpheme (*kan*) compared to the perfect (*àn*). Furthermore, this particle imparts an emphatic sense to the verb--shown by the telltale HL tonal contour.

- (15) a.        *lā*        ‘laugh!’                      *nāgī-wā*        ‘hit him!’  
           b.        *kán là* ‘do *not* laugh!’        *kán nàgī-wā* ‘do *not* hit him!’

In this case, the HL mapping starts with the negative particle *kan*. We assume that this negative particle appears immediately before the verb and thus provides the first tone-bearing unit for the HL emphatic morpheme.<sup>1</sup> The L appears on the verb and any object suffix receives a default Mid.

- (16)    morphosyntax  
           [HL]<sub>Agr</sub>        *nag-wa*                      underlying  
                               *nag-wa*                      Infl Deletion  
           phonology  
                               *nāg-wā*                      Default Mid  
                               *nāg ɪ-wā*                      Epenthesis
- morphosyntax  
           [HL]<sub>Agr</sub>        *kan nag-wa*                      underlying  
           [HL]<sub>Agr</sub>        *kan nag-wa*                      Infl Deletion (blocked under emphasis)  
           phonology  
                               *kan nag-wa*                      Tone Association  
                               [H+L]<sub>Ag</sub>  
                               *kán nàg-wā*                      Default Mid  
                               *kán nàg ɪ-wā*                      Epenthesis

The future tense is marked by the particle *lì*. The following verb uniformly has the default Mid tone.

- (17)    *àtìm lĩ lā*                      ‘Atim will laugh’  
           *àtì:m lĩ nāgī-wā*                      ‘Atim will hit him’  
           *f ɪ lĩ lā*                      ‘you sg. will laugh’  
           *f ɪ lĩ nāgī-wā*                      ‘you sg. will hit him’

We assume that the future particle appears in the Tns-Asp slot in the Infl node. Under standard assumptions in Autosegmental Phonology the HL Agr morpheme--if present in

<sup>1</sup> Cahill (1999:22) notes that the negative particle in Konni has variable positioning among the preverbal particles sometimes appearing at the beginning after the subject and other times preverbally.

the structure to begin with--will be unable to associate to the verb across the future particle. Hence, the verb will receive the default Mid tone.

- (18) morphosyntax  
       fì [HL]<sub>Agr</sub> [fì]<sub>Tns</sub> la       underlying
- phonology  
       fì [HL]<sub>Agr</sub> [fì]<sub>Tns</sub> la       Tone Association (blocked)  
       fì ì lā                    Default Mid  
       'you will laugh'

We now turn to the most puzzling piece of the verbal inflection. In the present tense the verb is preceded by a particle *à* which we assume occupies the Tns-Asp slot. Like the future *lì*, it is also Low in tone. Given the analysis in (18), we expect the verb to appear with the default mid tone. This prediction is correct, as shown by the paradigm in (19).

- (19) àfì:m à lā               ‘Atim laughs’  
       mí à lā                 ‘I emph. laugh’  
       wà à lā                 ‘he laughs’
- àfì:m à nāgī ná:b       ‘Atim hits a cow’  
       mí à nāgī ná:b       ‘I emph. hit a cow’  
       wà à nāgī ná:b       ‘he hits a cow’

In the present tense negation is signaled by the particle *kàn* which we recall appeared preverbally in the imperative. Here it appears in place of the *à* and has a low tone. It makes sense to analyze *kàn* as the fusion of negation and the Tns-Asp particles. It also appears preverbally. Like *lì* and *à*, *kàn* also blocks any association of the HL Agr and so the verb receives a default Mid.

- (20) àfì:m kàn lā           ‘Atim does not laugh’  
       mí kàn lā             ‘I emph. do not laugh’  
       wà kàn lā             ‘he does not laugh’
- àfì:m kàn nāgī ná:b   ‘Atim does not hit a cow’  
       mí kàn nāgī ná:b   ‘I emph. do not hit a cow’  
       wà kàn nāgī ná:b   ‘he does not hit a cow’

The surprise is that when the present tense verb has an enclitic pronoun then the HL contour systematically appears on the verb (21a). The same thing happens when the verb is negated (21b).

- (21) a. àfɪ:m à nàgí-wà      ‘Atim hits him’  
          mí à nàgí-wà        ‘I emph. hit him’  
          mà: nàgí-wà         ‘I hit him’  
          wà à nàgí-wà        he hits him
- b. àfɪ:m kàn nàgí-wà      ‘Atim does not hit him’  
          mí kàn nàgí-wà       ‘I emph. do not hit him’  
          ñ kàn nàgí-wà        ‘I do not hit him’

Evidently the Agr morpheme has jumped over the Tns-Asp particle *à* (and its negative counterpart *kàn*) to lodge on the verb.<sup>2</sup> We postulate the morphosyntactic rule of affix hopping in (22). The [+present] encompasses the particle *à* as well as the fused negative *kàn*. The rule does not apply in the imperative since it plausibly lacks a Tense node.

- (22)            Agr + [+present] + [verb+pro]  
                   1        2                    3            ->     2    1    3

This rule precedes the one that deletes the Agr morpheme after third person subjects. By placing the Agr after the *à* and *kàn* Tns-Asp particles, Agr is no longer adjacent to the third person subject and so will escape deletion.

- (23) morphosyntax
- |    |  |        |              |
|----|--|--------|--------------|
| wà | [HL] <sub>Agr</sub> [à] <sub>Tns</sub> | nag-wa | underlying   |
| wà | [à] <sub>Tns</sub> [HL] <sub>Agr</sub> | nag-wa | Agr Lowering |
|    | inapplicable                           |        | Agr Deletion |
- phonology
- |    |   |               |                        |
|----|---|---------------|------------------------|
| wà | à | nag-wa        | Tone Association       |
|    |   | H L           |                        |
| wà | à | nágí-wà       | Epenthesis             |
| wà | à | nǎgí-wà       | Low Tone Spreading     |
| wà | à | nàgí-wà       | Rising Tone Absorption |
|    |   | ‘he hits him’ |                        |

To summarize, our analysis of Buli verbal inflection has postulated two tonal particles: a HL marking Agr followed by a L marking Tns-Asp. The latter receives segmental expression in the future and present tenses as *lĩ* and *à* respectively in which case the verb takes a default Mid tone. When the Tns-Asp slot is not segmentalized then the tones comprising the inflection are free to associate to the verb. When both Agr and Tns-

<sup>2</sup> An alternative analysis in which object pronouns are syntactically high and attract the verb is more problematic because the Tns-Asp particle must move with the verb and so the *à* will still intervene between the Agr and the verb.

Asp are available to associate to the verb preference seems to be given to the Agr. We have not encountered a context where both morphemes are clearly expressed on the verb.<sup>3</sup> Our analysis has consolidated the various realizations of the HL contour as exponents of an Agr morpheme. Three factors control its distribution. It is deleted after third person subjects. It is also absent in contexts of impoverishment (stative and imperatives). But in the latter cases it can be resuscitated under emphasis--a reflex of the emphatic *do* syndrome. Finally, the Agr particle is attracted to a heavy verb hopping over the present tense morpheme.

### 3. Other Constructions

We briefly survey several grammatical contexts which alter the makeup of the [Agr + Tns-Asp] Infl slot and hence, given our analysis, affect the tonal pattern of the verb in predictable ways.

#### 3.1 Serial Verbs

The serial verb construction consists of two verbs that share an object that intervenes between the two verbs. (See Lee 2002 for analysis of serial verbs in Buli). Typically, the first verb displays the verbal inflection while the second appears in some nonfinite form. This is largely but not entirely true for Buli. Our paradigms use the canonical serial verb composed of *tūsī* ‘push’ and *l<sup>w</sup>ānsī* ‘drop’. When combined into a serial verb, the meaning changes to ‘push down’.

The paradigm in (24) shows some serial verb constructions in the perfect tense.

- |      |  |                                 |
|------|--|---------------------------------|
| (24) | a. ñ túsí bāŋ l <sup>w</sup> ànsǐ          | I pushed down a bangle          |
|      | b. àfí:m túsí bāŋ l <sup>w</sup> ànsǐ      | atim pushed down a bangle       |
|      | c. àfí:m àn túsí bāŋ l <sup>w</sup> àsī yà | atim did not push down a bangle |

The first verb shows the agreement alternation. It takes an underlying H when the subject is first or second person (24a) and L when it is third person (24b). Low Tone Spread and Rising Tone Absorption apply to derive the *túsí* alternant. V<sub>1</sub> is also where the negation is expressed (24c). In the perfect tense V<sub>2</sub> is consistently low in tone. This suggests that the underlying structure of the IP in the serial construction is [Subj-Agr-Tns-Asp-V<sub>1</sub>-Obj-Tns-Asp-V<sub>2</sub>] with both verbs inflected for tense/aspect.

- (25) morphosyntax

<sup>3</sup> Barasana has examples in which two tonal prefixes precede the verb. Only the innermost one is realized. See Gomez-Imbert & Kenstowicz (2000) and Gomez-Imbert (2001) for discussion.

̀̀ [HL] <sub>Agr</sub> [L] <sub>Tns</sub> tus b̄aŋ [L] <sub>Tns</sub> l <sup>w</sup> ans	wà [HL] <sub>Agr</sub> [L] <sub>Tns</sub> tus b̄aŋ [L] <sub>Tns</sub> l <sup>w</sup> ans	underlying
inapplicable	wà [L] <sub>Tns</sub> tus b̄aŋ [L] <sub>Tns</sub> l <sup>w</sup> ans	Agr Deletion
<u>phonology</u>		
̀̀ tus b̄aŋ l <sup>w</sup> ans	wà tus b̄aŋ l <sup>w</sup> ans	Tone Association
[HL] <sub>Agr</sub> [L] <sub>Tns</sub>	[L] <sub>Tns</sub> [L] <sub>Tns</sub>	
̀̀ túsí b̄aŋ l <sup>w</sup> ànsì	wà tùsì b̄aŋ l <sup>w</sup> ànsì	Epenthesis
'I pushed down a bangle'	'he pushed down a bangle'	

There is one complication. In the serial construction when the subject is first or second person, encliticization of an object pronoun is blocked and the strong form of the pronoun (with a High tone) must be used instead. This means that we are unable to demonstrate an example in which the Low component of the HL Agr appears on the verb.

- (26) wà tùsì-m̄ l<sup>w</sup>ànsì he pushed me down  
wà tùsì m̄ l<sup>w</sup>ànsì he pushed me emph down  
f̄i tùsí mí l<sup>w</sup>ànsì you pushed me emph down  
\*f̄i tùsí-m̄ l<sup>w</sup>ànsì you pushed me down

In the present each verb takes a segmentally lexicalized tense morpheme: Tns-V<sub>1</sub> Tns-V<sub>2</sub>.

- (27) a. àf̄i:m à t̄usì mí á l<sup>w</sup>ānsì atim is pushing me emph down  
b. mí à t̄usì bí:k á l<sup>w</sup>ānsì I emph am pushing down a child  
c. mí túsí bí:ká á l<sup>w</sup>ānsì I emph push down the child  
d. àf̄i:m tùsì m̄ á l<sup>w</sup>ānsì atim pushes me emph down

V<sub>2</sub> consistently has a high-toned *á* particle. The verb itself carries a default mid. When the serial verb has the progressive sense, then V<sub>1</sub> is preceded by the low tone tense-aspect particle *à*. V<sub>1</sub> has the default mid. This is what we expect since the *à* particle blocks the association of the tones of the AGR morpheme on V<sub>1</sub>. Since the verb cannot take an enclitic pronoun in the first and second person we cannot test whether the Agr morpheme can skip over the present tense particle in the serial verb construction. Finally, when the serial verb has an habitual sense then V<sub>1</sub> has no segmental preverbal particle. In this case, the H(L) agreement morpheme can appear on V<sub>1</sub> when the subject is not third person (27c). In the third person, the Agr is deleted and so only the Tense L survives; it docks to the verb (27d).

### 3.2 Subordinate Clauses

We mentioned that the Agr morpheme is barred from subordinate clauses. We briefly make this point here with several examples. In (28) we show verb [nag] 'hit' in a relative clause. (See Hiraiwa 2002 for an analysis of Buli relatives). Relatives are marked by a final particle *lá*. Subject relatives take the complementizer *lí* while nonsubject relatives take *tì*. In the perfect tense the verb shows a uniform Low tone regardless of the person of the subject. This is the L of the Tns-Asp particle. In main clauses it is pushed aside by the Agr HL with first and second person subjects.

- (28) àfì:m nyà bí:ká fì mǐ nàgǐ lá atim saw the child that I emph hit  
 àfì:m nyà bí:ká fì ò nàgǐ lá atim saw the child that I hit  
 ò nyà bí:ká fì àfì:m nàgǐ lá I saw the child that atim hit

Since the agreement morpheme is banned from the relative clause, there can be no Agr Lowering (22) that we find in the main clause of present tense verbs. We can ask what tone an object pronoun will receive in the absence of the Agr morpheme. Other things being equal, we expect a default mid to appear. This is a correct prediction, as shown by the paradigm in (29).

- (29) a. ò nyà bí:ká lí nàgǐ-mǎ lá I saw the child that hit me  
 b. ò nyà bí:ká lí à nāgǐ-bā lá I saw the child that hits them  
 c. àfì:m à nàgǐ-bà atim hits them

In (29a) the verb of the relative clause is in the perfect tense. Thus, the verb takes the Tns L tone and the enclitic object suffix takes default Mid tone. But in (29b) the tense node is lexicalized as *à*. The Infl node thus has no tone to contribute to the verb, which consequently surfaces with default mid. Compare the present tense of the corresponding main clause verb in (29c). Here the Agr HL skips over the Tns-Asp *à* to show up on the verb.

Buli has several constructions in which the verb of the subordinate clause appears in a nonfinite form. (See Norris 2002 for discussion). One of these is as complement to the main clause verb *yā:lí* 'want'. If a clause lacks inflection and if inflection is the source of the tone for the verb, then we expect the verb to appear in the default mid tone in this context. The paradigm in (30) shows that this expectation is confirmed.

- (30) mà: yā:lí (àyǐn) àfì:m nāgǐ-mǎ I want (that) atim to hit me  
 àfì:m à: yā:lí (àyǐn) ò nāgǐ-wā atim wants (that) me to hit him

#### 4. Summary and Conclusions

We have proposed an analysis of the tonal alternations found in the verbal inflection of Buli. Once the general processes of Low Tone Spread and Rising Tone Absorption are factored away, the verb displays an alternation between HL  $\approx$  L and M melodies. The Mid is a default while HL and L are treated as reflections of two inflectional particles: Agr and Tns-Asp. The body of the analysis involves morphosyntactic rules that delete, insert, and shift the location of these particles.

While internally consistent, the analysis requires further research on three fronts. First, more descriptive work on the grammar of Buli is required to test the basic premises of the analysis. An alternative analysis in terms of different tonal melodies in a verb's paradigm is certainly worth exploring. Second, if the tonal particle analysis is correct, then we expect to find other Gur languages in which the postulated Agr and Tns-Asp particles are segmentally realized. Here again much further research is required. We can only point to two parallels from Konni. First, Cahill (1999) documents the alternation between L in third person and HL in first and second in the perfective and imperfective tenses. In the paradigm in (31) for the verb [st] 'bathe' the L portion of the HL is floating and triggers downstep on the -á suffix.

(31)	̀̀n sɪ́-á mǐŋ	̀̀tɪ́ sɪ́-á mɪŋ
	sɪ́-á mɪŋ	nǐ́ sɪ́-á mǐŋ
	̀̀ù sɪ́-á mǐŋ	bà sɪ́-á mǐŋ

Second, Konni allows a greater range of adverbial particles to stand between the subject and the verb: for example *̀̀ù yà bɔ̀b-á mǐŋ* 'he is still tying' vs. *̀̀n yá bɔ̀b-á mǐŋ* 'I am still tying'. Here we see the alternation showing up on the adverb immediately following the subject pronoun; the following verb is stable.

Finally, theoretically the interface among syntax and phonology on the one hand and morphosyntax and phonology on the other is still poorly understood. As mentioned at the outset, tone and accent seem to be particularly susceptible to expressing this relation. Intonation and phrasing are signaled suprasegmentally through variation in F0 and timing rather than through segmental changes. In this study we have invoked tonal particles as the bridge between the syntax and the verbal inflection. But undoubtedly in other languages this is not a viable option and the tonal patterns are part of a verb or noun's paradigm structure. How is this to be described formally? What are the morphological categories that are expressed tonally? Tense-aspect, singular vs. plural (at least in nouns in many Slavic languages), and person (Gur, Barasana) are well attested. What are the mechanisms for expressing these differences? Is agreement on the verb appropriate? If so, where are these features encoded and how does the grammar refer to them? These are questions of general interest that can only be addressed in the context of detailed analysis of individual languages.

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