

Silozi Phrasal Tonology

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Abstract

In Silozi, High tones are subject to a number of different processes including shift, doubling and deletion. After establishing these on the basis of isolation forms and two-word phrases, this paper examines a range of complex phrases which reveals a very productive process of phrasal High insertion, whereby a High tone is inserted and linked to the final tone bearing unit of any phonological phrase which is not pre-pausal. Tonal processes are sensitive to lexical categories. It is shown, using Match Theory, that phonological phrase boundaries are established on the basis of syntactic phrases. While these prosodic phrase edges are targets for Phrasal High Insertion, the surface realization of the inserted High in these locations can in fact be blocked by the Obligatory Contour Principle. The blocking must consider whether the existing High precedes or follows the target of High Tone Insertion as well as the part of speech of the words on either side of the phonological phrase boundary. The phonological phrasing of a number of different types of pre- and post-verbal constituents is analysed. Finally, adverbs are examined in some detail. Some are shown to straightforwardly phrase with a preceding verb, some apart from a preceding verb, and a final set exhibiting mixed properties.

Keywords: tone shift, tone doubling, syntax-prosody interface, Bantu, adverbs

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1 Introduction

Silozi (Guthrie K.21/S.30) is one of Zambia's seven designated regional languages, and is also spoken in parts of Botswana, Zimbabwe, and Namibia. Eberhard et al. (2024) estimate there are approximately 734,000 speakers overall. In terms of existing literature, there are a number of good works which provide solid phonological and morphological descriptions of the language, including Jalla (1937), Gowlett (1967), Mwisiya (1977), and Fortune (2001). Gowlett (1967), Yukawa (1987), and Kamwengo (2008) provide a range of tonal data on many verb tenses/aspects/moods, but a number of verb forms are not discussed, few phrases are presented, and no formal analysis is attempted. Bickmore (2024) builds on those studies and presents a fuller description and analysis of Silozi tone. The focus of that work was mainly the word-level tone of verbs. The phrases presented were limited to two-word Verb-Object and Verb-Adverb phrases (where only two adverbs were used). The current study vastly expands the description and analysis to a range of new phrases of various sizes. All the data presented here were elicited in the years 2022–2024 with Mr. Mubiana Liswaniso, a 75-year-old native speaker of Silozi from Mongu, Zambia, currently residing in Lusaka.

Silozi has a five-vowel system, typical of many Bantu languages, shown in (1), and has lost the Proto Bantu contrast in vowel length.

(1) Silozi Vowels

	Front	Back
High	i	u
Mid	e	o
Low		a

The consonant inventory is given in (2) using IPA characters with any divergent orthographic representations in brackets where relevant.

(2) Silozi Consonant Inventory

	Bilabial	Labio-dental	Alveolar	Palatal	Velar	Glottal
Stops	p (b)		t d	c ɟ <j>	k g	
Fricatives	β	f	s z	ʃ <sh>		h
Nasals	(m)		n	ɲ <ny>	ŋ <ñ>	
Liquids			l			
Glides				j <y>	w	

Deviations from the IPA in our data presentation (which follow the local orthography) are: <j>=[ɟ], <ñ>=[ɲ], <ny>=[ɲ], <sh>=[ʃ], <y>=[j], =[b] post-nasally, and otherwise [β]. <n> is realized homorganically with the following consonant.

2 Summary of the word-level tonology

Before presenting Silozi phrases, let us first establish the basic tone rules of the language (summarizing the analysis presented in Bickmore 2024). These are exemplified nicely in verbal infinitives, which have the structure: Infinitive Prefix /ku-/ – Root – Extensions – Final Vowel.

Tone is contrastive in verb roots as seen in the minimal pairs below, where the roots in (3a–c) are toneless and those in (3d–f) are underlyingly High.

- | | | | | |
|-----|--------------------|-------------|--------------------|--------------------|
| (3) | a. <i>kù-sèh-à</i> | ‘to laugh’ | d. <i>kù-séh-à</i> | ‘to cut’ |
| | b. <i>kù-bàt-à</i> | ‘to want’ | e. <i>kù-bát-à</i> | ‘to be cold’ |
| | c. <i>kù-zùs-à</i> | ‘to remove’ | f. <i>kù-zús-à</i> | ‘to wake up (tr.)’ |

Let us now examine infinitives with toneless roots, with and without object markers. Representative verbal infinitives with toneless roots and no object markers are given in (4).

(4) Verbal infinitives with toneless roots

- | | |
|------------------------|-----------------|
| a. <i>kù-w-à</i> | ‘to fall’ |
| b. <i>kù-lim-à</i> | ‘to cultivate’ |
| c. <i>kù-pàzùl-à</i> | ‘to tear apart’ |
| d. <i>kù-bètèk-à</i> | ‘to betray’ |
| e. <i>kù-likànis-à</i> | ‘to copy’ |

Verbs with toneless roots followed by a direct object or one of the adverbs *hàhúlù* ‘a lot’ or *bù-màswè* ‘poorly’ are given in (5) and (6) respectively. As can be seen, there is no change in the tone of the infinitive – it remains all-Low.

(5) Verb with toneless root + Direct Object

- | | |
|--------------------------------|-------------------------------|
| a. <i>kù-lim-èl-à mù-limì</i> | ‘to cultivate for the farmer’ |
| b. <i>kù-pàzùl-à lì-kà</i> | ‘to tear apart the things’ |
| c. <i>kù-bètèk-à bà-sàlì</i> | ‘to betray the women’ |
| d. <i>kù-likànis-à mù-lúti</i> | ‘to copy the teacher’ |

(6) Verb with toneless root + Adverb

- | | |
|---------------------------------|-----------------------|
| a. <i>kù-w-à hàhúlù</i> | ‘to fall a lot’ |
| b. <i>kù-lim-à bù-màswè</i> | ‘to cultivate poorly’ |
| c. <i>kù-likànis-à bù-màswè</i> | ‘to copy poorly’ |
| d. <i>kù-likànis-à hàhúlù</i> | ‘to copy a lot’ |

Next, let us examine verbal infinitives with a High-toned root. Infinitives with stems of various numbers of syllables are given below. Isolation forms are in (7), while non-phrase-final forms, followed by either a direct object or adverb, are given in (8). (The proposed URs are given in the third column.) We will see below that only High tones are targeted by phonological processes and therefore we assume an underlying H vs. Ø contrast.

- (7) Verbal infinitives with a High-toned root
- | | | |
|------------------------------|-------------------------------|----------------------------------|
| a. <i>kù-c-à</i> | ‘to eat’ | /c ^H -a/ ¹ |
| b. <i>kù-c-ís-à</i> | ‘to cause to eat’ | /c ^H -is-a/ |
| c. <i>kù-lút-à</i> | ‘to teach’ | /lút-a/ |
| d. <i>kù-bín-à</i> | ‘to dance’ | /bín-a/ |
| e. <i>kù-lút-él-à</i> | ‘to teach for’ | /lút-el-a/ |
| f. <i>kù-bín-él-à</i> | ‘to dance for’ | /bín-el-a/ |
| g. <i>kù-bùlúk-à</i> | ‘to keep’ | /bùlúk-a/ |
| h. <i>kù-bùlúk-él-à</i> | ‘to keep for’ | /bùlúk-el-a/ |
| i. <i>kù-pòtòlòh-à</i> | ‘to go around’ | /pòtòlòh-a/ |
| j. <i>kù-pòtòlòh-él-à</i> | ‘to go around for’ | /pòtòlòh-el-a/ |
| k. <i>kù-bùlúk-él-àn-à</i> | ‘to keep for each other’ | /bùlúk-el-an-a/ |
| l. <i>kù-pòtòlòh-él-àn-à</i> | ‘to go around for each other’ | /pòtòlòh-el-an-a/ |

Beginning with the longest forms in (7j–l), we see that the root-initial High tone has undergone two processes. It has shifted onto the following Tone Bearing Unit (TBU), after which it has doubled onto the next TBU. This, in fact is the default behavior of underlying High tones in Silozi, though a range of factors can prohibit or limit these two processes. For example, there is no shift of the underlying H in (7b–d). This is due to a prohibition/constraint on having a High-toned pre-pausal TBU.² This same prohibition prevents the underlying H in the stem from surfacing at all in (7a). While Tone Shift takes place in (7e–i), Tone Doubling onto the subsequent TBU does not. It turns out that Tone Doubling never targets a TBU within the final two TBUs of a phrase. These constraints on Tone Shift and Tone Doubling are also apparent when an infinitive with a High root is in non-phrase-final position, as shown in (8).

- (8)
- | | | |
|---------------------------------|-------------------------------|-------------------------|
| a. <i>kù-c-á bú-màswè</i> | ‘to eat poorly’ | (cf. <i>bù-màswè</i>) |
| b. <i>kù-lút-á bá-limì</i> | ‘to teach the farmers’ | (cf. <i>bà-limì</i>) |
| c. <i>kù-lút-él-á bà-tù</i> | ‘to teach for the people’ | |
| d. <i>kù-bùlúk-á lù-shwàrà</i> | ‘to keep the spoon’ | (cf. <i>lù-shwàrà</i>) |
| e. <i>kù-bùlúk-él-à bà-lútì</i> | ‘to keep for the teachers’ | |
| f. <i>kù-pòtòlòh-à bà-tù</i> | ‘to go around the people’ | |
| g. <i>kù-pòtòlòh-él-à bà-tù</i> | ‘to go around for the people’ | |

While the H in the root ‘eat’ could not be realized in the isolation form when the verb is pre-pausal (7a), it can when the word is non-pre-pausal, as seen in (8a), after which it doubles. While a root H in penult position such as (7c) could not shift due to the prohibition of pre-pausal Hs, when that same infinitive is not pre-pausal, Tone Shift does occur (8b). Next, while the High in a form such as (7h) could shift, but did not double due to the constraint against doubling into the final two syllables of a phrase, we see in the analogous non-phrase-final form in (8e) that doubling will occur when the same infinitive is non-phrase-final. Lastly, the forms in (8c, d) illustrate yet another tonal process. If the rule of Tone Shift moves a High onto the penult of a word, and that word is non-phrase-final, then a second shift process, which we will refer

¹ The superscripted H in the UR of (7a, b) indicates that the root is composed of the consonant /c/ as well as a floating H tone.

² We will see evidence below that the domain within which a High cannot surface in final position is larger than the phonological phrase, likely the intonational phrase.

to as Penult Shift, takes place, moving the High onto the final TBU of the verb (after which it undergoes the normal Doubling process where applicable).

We note here that “shift and double” languages such as Silozi seem to be typologically uncommon. The only other cases known to the authors are Saghala [Kenya] (Patin 2009) and Holoholo [DRC, Tanzania] (Coupez 1955). The tonological processes and constraints noted thus far are summarized below.

(9) Basic tonological processes

- a. All pre-pausal TBUs surface as Low. This is seen in the verb ‘to eat’ where its H surfaces in (8a) but not in (7a).
- b. Tone Shift: a general process which shifts a H to the following syllable. But, 1) never onto a pre-pausal TBU (consistent with (a) above), and 2) the process is confined to the word –i.e. a High never shifts into a following word (8a).
- c. Penult Shift: if Tone Shift moves a H onto a penult, that tone undergoes a subsequent shift to the ultima (as long as the ultima is not pre-pausal (consistent with (a) above)).
- d. Tone Doubling: after the two shift rules (9b, c), a High tone will double onto the following syllable, if that target TBU precedes the penultimate TBU of the phrase.

We present a full derivation of (8d) below, where the processes of Tone Shift, Penult Shift and Tone Doubling are all exemplified (10).

(10) Derivation of (8d)

ku-buluk-a lu-shwana UR

|
H

ku-buluk-a lu-shwana Tone Shift

|
H

ku-buluk-a lu-shwana Penult Shift

|
H

ku-buluk-a lu-shwana Tone Doubling

\ /
H

Next, let us examine verbal infinitives with an object marker and a toneless root.

(11) Verbs with object marker and a toneless root

- a. *kù-kà-bát-à* 'to want it (C12)'
- b. *kù-lì-tís-à* 'to bring them (C8)'
- c. *kù-bà-lím-èl-à* 'to cultivate for them (C2)'
- d. *kù-sì-pázùl-à* 'to tear it (C7) apart'
- e. *kù-mù-pázùl-èl-à* 'to tear apart for him/her (C1c1)'
- f. *kù-bà-líkánìs-à* 'to copy them (C2)'

The surface tonology of all the forms in (11) can be directly accounted for by positing that all object markers in Silozi are underlyingly High. That High tone then undergoes the very same processes that the root High did in (7) and (8).

(12) Verbs with object marker and a High-toned root

- a. *kù-bà-lút-à* 'to teach them (C2)'
- b. *kù-bà-lút-él-à* 'to teach for them (C2)'
- c. *kù-tù-bùlúk-à* 'to keep them (C13)'
- d. *kù-lù-bùlúk-èl-à* 'to keep for us'
- e. *kù-lì-pòtòlòh-à* 'to go around them (C8)'
- f. *kù-bà-pòtòlòh-èl-à* 'to go around for them (C2)'

The forms in (12) show evidence of “Reverse Meeussen’s Rule” (also referred to in the literature as Anti-Meeussen’s Rule) whereby the H on the object marker deletes before a root H. The root High then shifts and doubles exactly as it did in the forms in (7) and (8).

Turning to finite verbal forms, the surface tonology of verbs within many tense, aspect, mood and polarity (TAMP) markers is completely predicted by the processes/rules listed in (9), as exemplified below.

(13) a. *Lù-sá-líkánìs-à.*

/lù-sa-likanis-a/
1 PL.SM-PERS-copy-FV
'We are still copying.'

b. *Nè-lù-líkánìs-à.*

/ne-lù-likanis-a/
PST.PERS-1 PL.SM-copy-FV
'We were copying.'

c. *Lw-àà-bà-líkánìs-à.*

/lu-a-bá-likanis-a/
1 PL.SM-PRES-C2.OM-copy-FV
'We are copying them.'

d. *Bà-sá-mú-líkánìs-à.*

/bá-sa-mú-likanis-a/
C2.SM-PERS-C1.OM-copy-FV
'They are still copying him/her.'

In (13a–c) the sole underlying H, whether it be on the subject marker or the object marker, undergoes Tone Shift and then Tone Doubling. We note here that while all object markers are underlyingly High-toned, the tone of subject markers varies by TAMP. As detailed in Bickmore (2024), in some TAMP categories all subject markers are High, and in others, all the 3rd person subject markers (both human and non-human) are underlyingly High, while the first and second singular and plural human subject markers are toneless. This accounts for the difference in the first person plural subject markers being H in (13a) and toneless in (13c).

In (13d) there are two underlying Hs and they both undergo Tone Shift and Tone Doubling. We note that the H on the subject marker undergoes Doubling even though this causes an Obligatory Contour Principle (OCP) violation (defined as two adjacent Tone Bearing Units linked to separate H autosegments), resulting in a phonetic downstep. We follow Odden’s (1982) account of downstep in languages with tonal underspecification, which we assume for Silozi. Rather than have downstep signaled by a floating Low, as it is in many languages, in the event Low tone is not present, as is the case for Silozi, downstep is formally the result of two adjacent TBUs linked to different H autosegments. This occurs when Doubling spreads a High tone to a TBU which immediately precedes a TBU which is linked to a different High autosegment.

As is true for most tonal Bantu languages, there is evidence in Silozi for grammatical High tones (Downing 2011; Odden and Bickmore 2014). These High tones, also referred to as “melodic” or “suffixal” High tones, are generated and linked to help express various inflectional properties of the verb. Certain combinations of tense, aspect, mood and polarity will trigger the insertion of a High tone into the verb stem and also determine where it links. In Silozi the docking location is limited to the penult or ultima.

An example of a TAMP where there is evidence of a Melodic High which links to the ultima, is the Recent Past (Morphological structure: SM-(OM)-Verb.Stem-*ile*). Phrase-final and non-phrase-final forms are given in (14) and (15), respectively.

- | | | | |
|---------|------------------------------|-------------------------|------------------|
| (14) a. | <i>Nì-w-ilè.</i> | ‘I fell.’ | /ni-w-ile/ |
| b. | <i>Ū-màt-ilè.</i> | ‘You (sg.) ran.’ | /u-mat-ile/ |
| c. | <i>Lù-likànis-izè.</i> | ‘We copied.’ | /lu-likanis-ile/ |
| (15) a. | <i>Nì-w-ilé há'húlù.</i> | ‘I fell a lot.’ | /hahúru/ |
| b. | <i>Ū-màt-ilé bú-màswè.</i> | ‘You (sg.) ran poorly.’ | /bu-maswe/ |
| c. | <i>Lù-likànis-izé bà-tù.</i> | ‘We copied the people.’ | /ba-tu/ |
| d. | <i>Lù-bàt-ilé 'shákàmè.</i> | ‘We wanted the hare.’ | /shákame/ |
| e. | <i>Lù-bàt-ilé kúlùbè.</i> | ‘We wanted the pig.’ | /kulube/ |

In all the verbs above, both the subject marker as well as the verb root are toneless. Yet in all the forms in (15), a High tone surfaces on the final TBU of the verb. Bickmore (2024) proposed that in this TAMP (as well as a few others) a grammatical High tone is inserted and linked to the verb-final TBU. It then undergoes Tone Doubling (9d). This Melodic High does not surface in (14) due to the prohibition on High tones in phrase-final position (9a). There is a spirantization process triggered by the final consonant of the verb base (Bickmore 2023) which often changes /l/ in suffixes to [z], as seen in (14c) and (15c).

An example of a TAMP where there is evidence of a Melodic High which links to the penult, is the Negative Present (Morphological structure: *a*-SM-(OM)-Verb.Stem-*i*). Phrase-final and non-phrase-final forms are given in (16) and (17) respectively.

- (16) High sm, toneless root
- | | | |
|---------------------------|------------------------|------------------|
| a. <i>À-lú-pá'zúl-i.</i> | ‘We are not tearing.’ | /a-lú-pazul-i/ |
| b. <i>À-bá-líkànis-i.</i> | ‘They are not copying’ | /a-bá-likanis-i/ |
- (17) a. *À-lú-pázúl-í lì-kà.* ‘We are not tearing the things.’
 b. *À-bá-líkànis-í bá-lìmi.* ‘They are not copying the people.’

In the examples above subject markers are underlyingly High (and are exceptionally marked not to undergo Tone Shift). In each case a Melodic High tone is added to the form, but this time to the penult TBU. It remains on the penult in the forms in (16), as Tone Shift cannot move a High to a pre-pausal TBU. In (17), we see that the H placed on the penult will undergo Tone Shift and then undergo Tone Doubling as appropriate.

To conclude this section, while we have seen above that the rules of Tone Shift, Penult Shift and Tone Doubling are extremely productive, these have been exemplified exclusively in verbs. It turns out that their productivity changes in other parts of speech. There is no evidence that Tone Shift affects High tones in nouns, adverbs or adjectives. This is evidenced by the fact that there are nouns (18), adverbs (19), and adjectives (20) which surface with an unshifted root-initial H, as seen below.

- | | | |
|------------------------|------------------------------|--------------|
| (18) a. <i>shákàmè</i> | ‘hare’ | /shákame/ |
| b. <i>mù-shímànì</i> | ‘boy’ | /mu-shímani/ |
| c. <i>kà-táfúnènò</i> | ‘upper part of the jaw bone’ | /táfuneno/ |
| d. <i>lì-káyámànà</i> | ‘extreme difficulty’ | /káyamana/ |
-
- | | | |
|-----------------------|------------|----------|
| (19) a. <i>kápìlì</i> | ‘soon’ | /kápili/ |
| b. <i>kámùsò</i> | ‘tomorrow’ | /kámuso/ |
-
- | | | |
|---------------------------|--------------|----------|
| (20) <i>yó-mú-'níyànì</i> | ‘young (C1)’ | /níyani/ |
|---------------------------|--------------|----------|

While Tone Shift does not apply in these words, we can see in (18c, d) that Tone Doubling does, spreading a High tone onto a pre-penult TBU, just as it does in verbs. (No H-initial adverbs or adjectives longer than 3 syllables have been found.)

3 Prosodic phrasing

We now turn to an expanded and detailed examination of the tonology of Silozi phrases. While there have been a variety of proposals in terms of the types of prosodic phrases which can be shown to be justified cross-linguistically (see, inter alia, Selkirk 1984; Selkirk 2011; Nespor and Vogel 1986; Inkelas and Zec 1990), we adopt those listed in (21).

- (21) Prosodic hierarchy
- a. Syllable
 - b. Foot
 - c. Prosodic Stem
 - d. Prosodic Word
 - e. Phonological Phrase
 - f. Intonational Phrase
 - g. Utterance

The focus in this paper will be the phonological phrase (ϕ). For purposes of this paper, we adopt Selkirk's (2011) Match Theory where she proposes that syntactic phrases map onto phonological phrases. More specifically, prosodic phrases will match syntactic phrases in terms of both left and right edges, as well as any recursion. Examples of this are given below. (ω indicates a prosodic word while ϕ indicates a phonological phrase.)

- | | |
|--|---|
| (22) Syntactic Phrasing | Matching Phonological Phrasing |
| a. [W W] _{XP} | ($\omega \omega$) _{ϕ} |
| b. [W] _{XP} [W] _{YP} | (ω) _{ϕ} (ω) _{ϕ} |
| c. [W [W W] _{XP}] _{YP} | ($\omega (\omega \omega)$) _{ϕ} |

In (22a) the two words constitute a single syntactic phrase. This generates the prosodic structure shown to the right where the two words belong to the same phonological phrase. In (22b) the first word constitutes a syntactic phrase, and the following word constitutes a different syntactic phrase that is not contained inside the first syntactic phrase. This generates a prosodic structure where each word belongs to a different phonological phrase. Finally, the example in (22c) illustrates the recursive nature of the matching, where the syntactic structure of the three words results in a recursive prosodic structure where a phonological phrase can be part of a larger phonological phrase, such as a verb phrase containing an object with a modifier.³

3.1 Phrasal High Insertion

In the few phrasal examples thus far considered (5, 6, 8) the verb is followed by an adverb or object noun phrase.⁴ Cross-linguistically, these are cases where the two words are generally shown to be part of the same syntactic phrase (presumably VP in the cases above) and therefore the same phonological phrase (22a). Below we present phrases of type (22b) – i.e. where two words are part of different syntactic phrases, generating a prosodic structure where they are part of different phonological phrases. As we will see below, when this occurs in Silozi, a process of Phrasal High Insertion (PHI) applies, generating a High tone and linking it to the final TBU before the right edge of a phonological phrase boundary.⁵ Right edge brackets mark the right

³ It should be noted that Selkirk's Match Theory is articulated in an Optimality Theoretic framework. The matching shown in (22) would result directly from the given syntax if no other constraints were relevant to the prosodic structure. Of course, in a specific language there can certainly be evidence of more highly ranked constraints, which would have an effect in the construction of the final prosodic structure. Constraints accounting for phonological effects can then refer to both left and right edges of prosodic structure.

⁴ We will refer to these types of noun phrases as DPs in our tree diagrams and syntactic representations, as is standard in Minimalist Syntax.

⁵ See Kisseberth and Abasheikh (2011) for a detailed study proposing that High tones are linked to a syllable near phrase edges in Chimwiini.

edge of a syntactic phrase, which corresponds to the right edge of a phonological phase. In (23), we assume that this is the right edge of the DP containing the indirect object: *mulimi* ‘farmer’ in (23a) and *batu* ‘people’ in (23b), following the analysis of Rutooro in Clemens and Bickmore (2021, 811).

- (23) V DP_{IO}] DP_{DO}
- a. *Nì-kà-tìs-èz-à mù-lìmí] lú-shwàná.*
 /ni-ka-tis-el-a mu-limi lu-shwana/
 1SG.SM-FUT-bring-APPL-FV C1-farmer C11-spoon
 ‘I will bring the farmer the spoon.’
- b. *Nì-kà-tìs-èz-à bà-tú] kúlùbè.*
 /ni-ka-tis-el-a ba-tu kulube/
 1SG.SM-FUT-bring-APPL-FV C2-person pig
 ‘I will bring the people the pig.’

In the examples in (23), the verb, indirect object, and direct object are all completely toneless underlyingly. On the surface, however, there is a High tone on the final TBU of the indirect object, which then undergoes Tone Doubling. We propose that the presence of this High is due to a process of Phrasal High Insertion (PHI), whereby a High tone is inserted and linked to the final TBU of a phonological phrase.⁶ In both sentences (23a, b) the indirect object but not the verb is located at a syntactic phrase edge (the DP). The verb and the indirect object, thus, form a prosodic phrase, which triggers the linking of a High on the final TBU of that phrase. With regard to the final TBU of the whole sentence/clause, we note that it does not really matter whether PHI is formalized to apply to the final TBU of every phonological phrase, or only non-final phonological phrases. If PHI attempted to link a High to the final TBU of the whole sentence, it would be unsuccessful, as we have already suggested (cf. fn. 2) that Silozi does not allow the final TBU of an intonational phrase to be High (9a).

Additional examples of sentences where two words (often found in a larger phrasal context) are separated by a phonological phrase boundary are given below in (24–33). In every case, the word shown before the right square bracket (]) is at end of a syntactic phrase. PHI is triggered in each case, placing a H on the final TBU of that word, which then undergoes Tone Doubling. The relevant syntactic phrases are the DPs containing the direct object (24–25), the object, and its modifiers in (26–29), or an adjunct (30–31). In all of these cases, the right edge of the syntactic phrase also corresponds to the right edge of a phonological phrase. In contrast, in (32–33), the object-marked object or post-verbal, agreeing subject is not located inside the VP and, as expected, this is spelled out with the verb forming a phonological phrase on its own. In (33), we show the contrasting phrasing for the two possible interpretations of the object marker: if the object marker is co-indexed with the object (33a) and (33c), there is a phrase break, while if they are not co-indexed, the object stays inside the VP (33b).

⁶This is why the generalization in (9a) is said to prohibit a High on a pre-pausal TBU. A High inserted by Phrasal High Insertion will in fact surface on a phrase-final TBU. Additionally, a reviewer asks if PHI in these cases doesn’t somehow work against the syntactic structure, in that the process of Tone Doubling “ignores” the right edge syntactic boundary after the indirect object. We would suggest that from a more purely phonological perspective, however, the behavior is not in fact unexpected as Tone Doubling has as its domain the intonational phrase and so is expected in some instances, such as this one, to occur across phonological phrase boundaries.

(24) V DP] ADV

- a. *Lù-kà-lif-à bà-limí] bú-màswè.*
/lu-ka-lif-a ba-limi bu-maswe/
1PL.SM-FUT-pay-FV C2-farmer C14-bad
'We will pay the farmers poorly.'
- b. *Nì-kà-tis-à kùlùbé] ká'cénu.*
/ni-ka-tis-a kulube kacénu/
1SG.SM-FUT-bring-FV pig today
'I will bring the pig today.'
- c. *Lù-kà-c-á kùlùbé] bú-màswè.*
/lu-ka-c.H-a kulube bu-maswe
1PL.SM-FUT-eat-FV pig C14-bad
'We will eat the pig poorly.'

(25) V ADV] DP_{DO}⁷

- a. *Lù-kà-lif-à bù-màswé] bá-limì.*
/lu-ka-lif-a bu-maswe ba-limi/
1PL.SM-FUT-pay-FV C14-poor C2-farmer
'We will pay the farmers poorly.'
- b. *Lù-kà-likànis-à kápí'lí] bá-limì.*
/lu-ka-likanis-a kápili ba-limi/
1PL.SM-FUT-copy-FV soon C2-farmer
'We will copy the farmers soon.'

(26) V [N POSS.PRN]_{DP,IO}] DP_{DO}

- Nì-kà-tis-èz-à mù-shímàni w-á-bó'ná] kùlùbè.*
/ni-ka-tis-el-a mu-shímani u-á-bona kulube/
1SG.SM-FUT-bring-APPL-FV C1-boy C1-ASS-3PL pig
'I will bring the pig to their boy.'

(27) V [N POSS.PRN]_{DP}] ADV

- Lù-kà-lif-a mù-likàni w-á-bó'ná] bú-màswè.*
/lu-ka-lif-a mu-likani u-á-bona bu-maswe/
1PL.SM-FUT-pay-FV C1-friend C1-ASS-3PL C14-bad
'We will pay their friend poorly.'

⁷ Our consultant noted that in phrases with both a direct object and adverb, while both orders are possible, the adverb-final one is much more common.

- (28) V [N POSS N]_{DP_{IO}}] DP_{DO}⁸
Nì-kà-tis-èz-à mù-shímànì w-à mú-lí'mí] kúlùbè.
 /ni-ka-tis-el-a mu-shimani u-á mu-limi kulube/
 1SG.SM-FUT-bring-APPL-FV C1-boy C1-ASS C1-farmer pig
 'I will bring the pig to the farmer's boy.'
- (29) V [N POSS N]_{DP}] ADV
Lù-kà-lùk-á mú-likànì w-à mú-lí'mí] bú-màswè.
 /lu-ka-lút-a mu-likani u-á mu-limi bu-maswe/
 1PL.SM-FUT-teach-FV C1-friend C1-ASS C1-farmer C14-bad
 'We will teach the farmer's friend poorly.'
- (30) V [N Adj]_{DP_{IO}}] DP_{DO}
Nì-kà-tis-èz-à mù-lì'mì yáá-màswé] kúlùbè.
 /ni-ka-tis-el-a mu-limi i-á-maswe kulube/
 1SG.SM-FUT-bring-APPL-FV C1-farmer AP1-ASS-bad pig
 'I will bring the bad farmer the pig.'
- (31) V [N Adj]_{DP}] ADV
Lù-kà-lif-à bà-lì'mì bá-bá-màswé] bú-màswè.
 /lu-ka-lif-a ba-limi bá-bá-maswe bu-maswe/
 1PL.SM-FUT-pay-FV C2-farmer AP2-ASS-bad C14-bad
 'We will pay the bad farmers poorly.'
- (32) Post-posed Subject: V] DP_{SBJ}
 a. *Bà-ká-lúkùlùh-á] bà-tù.*
 /bá-ka-lukuluh-a ba-tu/
 C2.SM-FUT-be.free-FV C2-person
 'The people will be free.'
- b. *Bá-mát-ilé bú-màswé] bá-lì'mì.*
 /bá-mat-ilé bu-maswe ba-limi/
 C2.SM-run-PST C14-bad C2-farmer
 'The farmers ran poorly.'
- (33) V] DP_{IO} (Verb has OM co-indexed with IO)⁹
 a. *Lù-sà-bà-líkánìs-èz-á] bá-lì'mì.*
 /lu-sa-bá_i-likanis-il-a ba-limi_i/
 1PL.SM-PERS-C2.OM-copy-APPL-FV C2-farmer
 'We are still copying for the farmers.'

⁸The H on the associative /á/ shifts if followed by noun (28), but not if followed by a pronoun (26).

⁹For examples of other Bantu languages where it has been shown that a direct object DP phrases apart from the preceding verb if the verb contains a co-indexed OM, see Bickmore (2007) for Cilungu and Kula and Bickmore (2015) for Bemba for cases involving tonal evidence, and Marten and Kula (2012) for a range of other Bantu languages, using both phonological and syntactic evidence.

V DP_{IO} (Verb has OM for DO)

- b. *Lù-sà-bàì-likánìs-èz-à bà-limì.*
/lu-sa-bá₁-likanis-il-a ba-limi₁/
1PL.SM-PERS-C2.OM-copy-APPL-FV C2-farmer
'We are still copying them₁ for the farmers.'

V] DP_{IO} (Verb has OM co-indexed with IO)

- c. *Lù-kà-bà-pòtòlòh-èl-á] bá-limì.*
/lu-ka-bá-pótoloh-el-a ba-limi/
1PL.SM-FUT-C2.OM-go.around-APPL-FV C2-farmer
'We will go around for the farmers.'

In every case above, PHI applies as predicted, inserting a H on the final TBU of a phonological phrase, which in each instance corresponds to the right edge of a syntactic phrase. The process is a completely general one, as the High can be linked to the final TBU of a noun (23, 24, 28, 29), adverb (25), possessive pronoun (26–27), adjective (30–31) or verb (32–33).

Finally, we note that PHI can apply multiple times in a single utterance when its structural description is met in different parts of the sentence, as seen in the example below.

(34) Verb IO] DO] ADV

- Nì-kà-tis-èz-à bà-limì] kùlùbé] bú-màswe] mwèndì.*
/ni-ka-tis-el-a ba-limi kulube bu-maswe mwendi/
1SG.SM-FUT-bring-APPL-FV C2-farmer pig C14-bad perhaps
'Perhaps I will bring the farmer the pig poorly.'

In the case of (34), there is the right edge of a phonological phrase boundary (corresponding to the right edge a syntactic phrase) after the indirect object *balimi* 'farmer', the direct object *kulube* 'pig', and the adverb *bumaswe* 'poorly'. As can be seen, PHI applies at each of these three boundaries.

To summarize the arguments to this point, the application of Phrasal High Insertion occurs on the final TBU of some words, but not others. It turns out that what is crucial in determining whether PHI occurs or not is the syntactic relationship between that word and a following word. If the two words are part of the same syntactic phrase – such as Verb-DO (5) and Verb-ADV (6) – then no PHI occurs, but if they belong to different phrases, then PHI will occur. We account for this formally by following the syntax to prosody mapping proposed in Selkirk (2011) and then positing a phonological rule inserting a High tone and linking it to the final TBU of a phonological phrase.

3.2 Phonological considerations in the application of PHI

We will see next that there can be phonological factors which inhibit the Phasal High from surfacing where it would be expected. Specifically, a High tone which immediately precedes and/or immediately follows the target of PHI can block the docking of the High tone, motivated by the OCP. We will see below that in these instances sometimes the High tone will link to the word-final TBU, despite the OCP violation, and sometimes it will not. Finally, we will see that the part of speech of the two words in question plays a role in determining whether PHI will apply or not.

3.2.1 Tone on the initial TBU of the following word

We begin by examining cases where the second of the two words in question (on either side of the phonological phrase boundary) has a word-initial High tone. In such cases High Tone Insertion is never blocked before a noun, even when that noun begins with a High tone.¹⁰ As seen in the examples in (35), High insertion applies in these cases, in violation of the OCP, resulting in phonetic downstep, as two successive TBUs are linked to distinct H autosegments (cf. the discussion above surrounding 13d).

- (35) a. *Nì-kà-tis-èz-à mù-límí] 'nóhà.*
 /ni-ka-tis-ez-a mu-limi nóha/
 1SG.SM-FUT-bring-APPL-FV C1-farmer snake
 'I will bring the farmer the snake.'
- b. *Nì-kà-tis-èz-à mù-límí] 'shákàmè.*
 /ni-ka-tis-el-a mu-limi shákame/
 1SG.SM-FUT-bring-APPL-FV C1-farmer hare
 'I will bring the farmer the hare.'

In (36), the H is inserted onto the word-final TBU of a verb (cf. 33), even though the following noun begins with a High tone.

- (36) *Lù-kà-ì-líkánìs-á] 'shákàmè.*
 /lu-ka-í-likanis-a shákame/
 1PL.SM-FUT-C5.OM-copy-FV hare
 'We will copy the hare.' (lit. 'we will copy it, the hare')

In (37), the H is inserted onto the word-final TBU of an adjective, when a High-initial noun follows.

- (37) *Nì-kà-tis-èz-à mù-límì yáá-màswé] 'shákame.*
 /ni-ka-tis-el-a mu-limi í-a-maswe shákame/
 1SG.SM-FUT-bring-APPL-FV C1-farmer AP1-ASS-bad hare
 'I will bring the hare to the bad farmer.'

As a quick point of comparison, we note here that a lexical (floating) H on a C root (cf. 7a, 8a) also docks onto the verb-final TBU before a H-initial noun.

- (38) *Lù-kà-c-á 'nóhà.*
 /lu-ka-c.H-a nóha/
 1PL.SM-FUT-eat snake
 'We will eat the snake.'

¹⁰ Only nouns without a noun class prefix, such as class 9 nouns can fall into this category as all noun class prefixes are toneless.

Let us now turn to cases where the second word is an adverb, rather than a noun. We have seen in a number of cases above that PHI applies when the second word is an adverb beginning with a toneless TBU (24, 27, 29, 31). High Tone Insertion is blocked, however, when the adverb begins with a High tone regardless of the grammatical category of the first word. Below, we show examples where PHI is blocked from applying within nouns (39a–d), adjectives (39e), and possessives (39f), before a following adverb which begins with a High toned TBU (Adverbs following verbs are discussed in detail below in Section 6.)

- (39) a. *Lù-kà-lif-à bà-lìmi] kápìli.*
 /lu-ka-lif-a ba-limi kápili/
 1PL.SM-FUT-pay-FV C2-farmer soon
 ‘We will pay the farmers soon.’
- b. *Lù-kà-lif-à bà-lìmi] hápè.*
 /lu-ka-lif-a ba-limi hápe/
 1PL.SM-FUT-pay-FV C2-farmer again
 ‘We will pay the farmers again.’
- c. *Lù-kà-likànìs-à bà-lìmi] kámùsò.*
 /lu-ka-likanis-a ba-limi kámuso/
 1PL.SM-FUT-copy-FV C2-farmer tomorrow
 ‘we will copy the farmers tomorrow.’
- d. *Nì-kà-tìs-èz-à mù-lìmi kúlùbè] hápè.*
 /ni-ka-tis-el-a mu-limi kulube hápe/
 C2.SM-FUT-bring-APPL-FV C1-farmer pig again
 ‘I will bring the pig to the farmer again.’
- e. *Lù-kà-lif-à bà-lìmi bá-bá-màswè] hándè.*
 /lu-ka-lif-a ba-limi bá-ba-maswe hánde/
 1PL.SM-FUT-pay-FV C2-farmer AP2-AP2-bad well
 ‘We will pay the bad farmers well.’
- f. *Nì-kà-tìs-èz-à mù-shímànì w-á-bónà] shákame.*
 /ni-ka-tis-el-a mu-shímani ú-á-bona shákame/
 1SG.SM-FUT-bring-APPL-FV C1-boy AP1-POSS-3PL hare
 ‘I will bring the hare to their boy.’

In summary, with regard to contexts where the second word in question has a High on the first TBU – the OCP will not block PHI when that following word is a noun, but will block it when it is an adverb.

3.2.2 Tone on the penultimate TBU of the first word

We now examine cases where there is an underlying High tone on the penult of the first word. Let us begin by considering cases where both the first and second words are nouns. We saw examples above where PHI applied in such cases, where the penult of the first noun was toneless

(23, 28, 34). In (40), we show cases where PHI occurs (and spreads to the initial TBU of the following word via Tone Doubling) even though the first noun has a penult H, creating an OCP violation. As noted previously, in such cases where two successive TBUs are linked to distinct High autosegments, a phonetic downstep results.

- (40) a. *Nì-kà-tìs-èz-à mù-sá'lí] lú-shwàná.*
 /ni-ka-tis-el-a mu-sáli lu-shwana/
 1SG.SM-FUT-bring-APPL-FV C1-woman C1 1-spoon
 'I will bring the spoon to the woman.'
- b. *Nì-kà-tìs-èz-à mù-lú'tí] lú-shwàná.*
 /ni-ka-tis-el-a mu-lúti lu-shwana/
 1SG.SM-FUT-bring-APPL-FV C1-teacher C1 1-spoon
 'I will bring the spoon to the teacher.'
- c. *Nì-kà-tìs-èz-à bà-bàpáli] lú-shwàná.*
 /ni-ka-tis-el-a ba-bapáli lu-shwana/
 1SG.SM-FUT-bring-APPL-FV C2-player C1 1-spoon
 'I will bring the spoon to the player.'

As seen below, however, there are some instances where the first noun has a High on the penult (just as was the case in 40), and instead of PHI applying (as was the case in 40), PHI is instead blocked.

- (41) a. *Lù-kà-lùt-èl-á mú-'sá'lí mù-lìmi.*
 /lu-ka-lút-el-a mu-sáli mu-limi/
 1PL.SM-FUT-teach-APPL-FV C1-woman C1-farmer/
 'We will teach the farmer for the woman.'
- b. *Lù-kà-lèk-èl-á mú-'sá'lí kùlùbè*
 /lu-ka-lek-el-a mu-sáli kulube/
 1PL.SM-FUT-buy-APPL-FV C1-woman pig/
 We will buy the pig for the woman.'

One difference between the forms in (40) and those in (41) is that adding a High tone to the final syllable of the first noun in the latter set would create two successive downsteps within the stem of the first word, a tonal pattern that seems never to occur in the language. Perhaps it's the avoidance of this specific sequence which blocks PHI in these cases. Interestingly, however, we note that a sequence of two successive downsteps is in fact attested *across* words. We see this in (42), where there is both a penult H on the first noun, as well as an initial H on the second noun. While one might surmise that this double OCP violation would inhibit PHI, it does not. The rule applies, yielding a downstepped H on the final TBU of the first noun, as well as the initial TBU of the second noun.

- (42) a. *Nì-kà-tìs-èz-à mù-sá'lí] 'shákame.*
 /Ni-ka-tis-el-a mu-sáli shákame/
 1SG.SM-FUT-bring-APPL-FV C1-woman hare
 'I will bring the hare to the woman.'
- b. *Nì-kà-tìs-èz-à mù-lú'tí] 'nóha.*
 /ni-ka-tis-el-a mu-lúti nóha/
 1SG.SM-FUT-bring-APPL-FV C1-teacher snake
 'I will bring the snake to the teacher.'

We now turn to phrases where the first word is a noun and the second word is an adverb. Below we see that in such cases where the noun has a High on the penult, PHI is blocked. The surface High on the final syllable of the first noun is due to Tone Doubling from the H on the penult.

- (43) a. *Nì-kà-tìs-à mù-sá'lí] bù-màswè.*
 ni-ka-tis-a mu-sáli bu-maswe/
 1SG.SM-FUT-bring-FV C1-woman C14-bad/
 'I will bring the woman poorly.'
- b. *Nì-kà-tìs-à mù-lú'tí] bù-màswè.*
 /ni-ka-tis-a mu-lúti bu-maswe/
 1SG.SM-FUT-bring-FV C1-teacher C14-bad
 'I will bring the teacher poorly.'

In (44) we consider the sequence Adverb – Noun. As seen below, PHI is blocked when the adverb has a penult High.

- (44) a. *Lù-kà-likànis-à hàhú'lú] bà-lìmi.*
 Lu-ka-likanis-a hahúlu ba-limi/
 1PL.SM-FUT-copy-FV a.lot C2-farmer
 'We will copy the farmers a lot.'
- b. *Lù-kà-likànis-à hápé] bà-lìmi.*
 /lu-ka-likanis-a hápe ba-limi/
 1PL.SM-FUT-copy-FV again C2-farmer/
 'We will copy the farmers again.'
- c. *Lù-kà-likànis-à hándé] bà-lìmi.*
 /lu-ka-likanis-a hánde ba-limi/
 1PL.SM-FUT-copy-FV well C2-farmer
 'We will copy the farmers well.'
- d. *Lu-ka-likanis-a cwá'lé] bà-lìmi.*
 /lu-ka-likanis-a cwále ba-limi/
 1PL.SM-FUT-copy-FV now C2-farmer
 'We will copy the farmers now.'

- e. *Lu-ka-likanis-a kàcénu] bà-lìmi.*
 /lu-ka-likanis-a kacénu ba-limi/
 1PL.SM-FUT-copy-FV today C2-farmer
 ‘We will copy the farmers today.’

Next, we consider cases where a verb is followed by a noun that is not inside the verb phrase—either a post-posed subject (45), or an object-marked object (46). In both cases PHI is blocked (the H on the verb-final TBU being due to Tone Doubling.)

- (45) a. *Bà-ká-'bín-á] bà-lìmi.*
 /bá-ka-bín-a ba-limi/
 C2.SM-FUT-dance-FV C2-farmer
 ‘The farmers will dance.’
- b. *Bà-ká-'lìk-á] bà-lìmi.*
 /bá-ka-lík-a ba-limi/
 C2.SM-FUT-try-FV C2-farmer
 ‘The farmers will try.’
- (46) a. *Lù-kà-bà-lút-á] bà-lìmi.*
 /lu-ka-bá-lút-a ba-limi/
 1PL.SM-FUT-C2.OM-teach-FV C2-farmer
 ‘We will teach the farmers.’
- b. *Nì-kà-lì-tís-á] lì-kà.*
 /ni-ka-lí-tis-a li-ka/
 1SG.SM-FUT-C8.OM-bring-FV C8-thing
 ‘I will bring the things.’

Finally, in (47) we consider the case of a pre-posed object. Here PHI is again blocked.

- (47) *Bà-lúti] nì-kà-bà-pòtòlòh-à.*
 /ba-lúti ni-ka-bá-pótòloh-a/
 C2-teacher 1SG.SM-FUT-C2.OM-go.around-FV
 ‘I will go around the teachers.’

To sum up this section, a penult H generally blocks PHI. The sole place where we see PHI applying is when a noun precedes another noun.

4 A second diagnostic for a phonological phrase boundary

We have seen above that PHI, which adds a High tone onto the final TBU of a word, can be accounted for by positing a right-edge phonological phrase boundary between that word and the following one. When no PHI occurs on a word in contexts where it is not phonologically blocked by the OCP (as detailed in section 3), it means that word is in the same phonological phrase as the following word (such as Verb + Noun (5) or Verb + Adverb (6)). A second process

which is sensitive to phonological phrase boundaries is the shifting of High tone from the penult to the ultima (whether that is due to Tone Shift (9b) or Penult Shift (9c)). We saw in section 2 that both Tone Shift and Penult Shift can move a High from the penult TBU of a verb onto the following (word-final) TBU when it is followed by another word (8b–d). Those were instances where the two words belonged to the *same phonological phrase*. In cases where a verb and the following noun belong to *different* phonological phrases (such as the configurations in 23–34), we find that a penult High in the verb does *not* undergo shift to the ultima (though it will spread onto the ultima via Tone Doubling). This can be seen in (45) and (46)—in (45) where the noun is a post-posed subject and in (46) because the object is co-indexed with the object marker on the verb.

In (46a) the H on the class 2 object marker /bá/ deletes due to Anti-Meeussen's Rule (cf. 12). The lexical H on /lút/ would normally shift onto the final (via Tone Shift and Penult Shift), but that occurs only when the following word is part of the same phonological phrase as the verb (8b–d). In (46), because of the presence of the object marker which is co-indexed to the following object, there is a phonological phrase boundary between the verb and the object. Due to this, the H does not shift to the penult. Instead, it remains there and blocks PHI, which, as we saw above, is normally triggered in this construction (33). It then undergoes Doubling to the ultima. In (45) (where there is a p-phrase boundary due to a post-posed subject (cf. 32) the analysis is the same. The H on the verb root does not shift to the ultima, blocks PHI, then undergoes Doubling. We review this important tone process here in preparation for an examination of data further below where these two diagnostics of phonological phrase boundaries – a) PHI and b) High Shift onto the ultima – make conflicting predictions about where the phonological phrase boundaries should be.

5 Phrasing of preverbal subjects

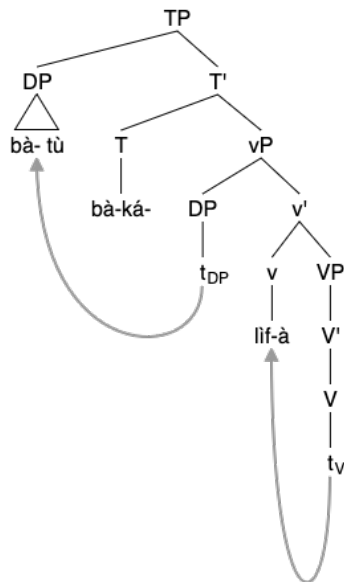
Preverbal subjects phrase separately from the verb phrase in many Bantu languages including Bemba (Kula and Hamann 2017, Chichewa (Kanerva 1990), Rutooro (Clemens and Bickmore 2021), and Shingazija (Patin 2016). This is expected because in clauses with preverbal lexical subjects, the final position of the subject DP is at the right edge of a syntactic phrase, and the verb begins a new syntactic phrase. Match Theory will therefore place the subject and following verb into separate phonological phrases. However, in many Southern Bantu languages, including isiXhosa (Jokweni 1995, Zerbian 2004), Northern Sotho (Zerbian 2006), and the dialect of Chichewa described in Downing and Mtenje (2017), subjects phrase together with the verb phrase, while in Zulu the phrasing of pre-verbal subjects is variable: the subject either phrases with the verb or on its own (Cheng and Downing 2016). For Sesotho, Khoali (1991) also analyses preverbal subjects as being inside the same phonological phrase as the verb. For Silozi, we will argue that subjects do phrase separately from verbs and use phonological rules to account for the lack of PHI in most instances, because there are cases where PHI appears with preverbal subjects.

Given the tonological processes posited above for Silozi, we therefore expect that 1) there would be no shift of a penult H onto the final (Section 4), and 2) PHI would apply to the subject DP (Section 3). As noted at the end of section 2, High tones in nouns never undergo Tone Shift, and indeed that's true when they appear as subjects, as seen below in (48c–d) and (50c–d). What about PHI? In many sentences, such as those below in (48) and (50), there is no evidence of Phrasal High Insertion on the last TBU of the subject, even in cases where there is no surface H on the subject marker.

- (48) a. *Bà-tù bà-ká-lif-à.*
 /ba-tu bá-ka-lif-a/
 C2-person C2.SM-FUT-pay-FV
 ‘The people will pay.’
- b. *Mù-lìmi ù-ká-màt-à.*
 /mu-limi ú-ka-mat-a/
 C1-farmer C1.SM-FUT-run-FV
 ‘The farmer will run.’
- c. *Bà-shímàni bà-ká-sèh-à.*
 /ba-shímani bá-ka-seh-a/
 C2-boy C2.SM-FUT-laugh-FV
 ‘The boys will laugh.’
- d. *Bà-sáli bà-ká-màt-à.*
 /ba-sáli bá-ka-mat-a/
 C2-woman C2.SM-FUT-run-FV
 ‘The women will run.’

We assume that a sentence like (48a), with a preverbal agreeing subject, has the syntactic structure shown in (49) with the subject DP-edge forming the pre-verbal phrase boundary.

- (49) Proposed structure of (48a)



(50) Subject + Copula

- a. *Bà-lìmi kì-bá-bà-ndè.*
/ba-limi kí-ba-ba-nde/
C2-farmer COP-AP2-AP2-good
'The farmers are good.'
- b. *Mù-lìmi kì-yó-mù-ndè.*
/mu-limi kí-yo-mu-nde/
C1-farmer COP-AP1-AP1-good
'The farmer is good.'
- c. *Shákàmè kì-yó-mù-ndè.*
/shákame kí-yo-mu-nde/
hare COP-AP9-AP9-good
'The hare is good.'
- d. *Bà-sáli kì-bá-bà-ndè.*
/ba-sáli kí-ba-ba-nde/
C2-woman COP-AP2-AP2-good
'The women are good.'

One way to account for the lack of PHI, and the one we adopt here, is to posit that PHI is blocked by the underlying H on the subject marker, even though it does ultimately shift. (See Section 3.2.1 for a discussion of other contexts where PHI is blocked when the following word begins with a High tone.) It should be recalled from Section 2 that third person singular and plural subjects of any kind (i.e. no matter the noun class) are demonstrably High-toned underlyingly. Thus, in the vast majority of TAMPs, which begin with the SM, such as those in (48) and (50), whenever the subject marker is High-toned, PHI will never link a High tone to the final TBU of the subject. But as noted in Section 2, non-third person singular subject markers are underlyingly High in some TAMPs, but toneless in others. It is possible to construct a conjunctive subject DP which will trigger first person plural subject agreement. In such instances in TAMPs where the non-third person singular subject markers are toneless (such as the Future), we find that PHI does in fact occur, as shown below.

(51) a. *Nà nì mú-álàfí lú-kà-màt-à.*

/na ní mu-alafi lu-ka-mat-a/
I and C1-doctor 1PL.SM-FUT-run-FV
'I and the doctor will run.'

b. *Nà nì lí-cólòcòló lú-kà-màt-à.*

/na ní li-colocolo lu-ka-mat-a/
I and C5-tall.young.man 1PL.SM-FUT-run-FV
'I and the tall young man will run.'

- c. *Nàni mú-lí' mí lú-kà-màt-à.*
/na ní mu-limi lu-ka-mat-a/
I and C1-farmer 1PL.SM-FUT-run-FV
'I and the farmer will run.'

As seen in each example in (51), PHI applies to the final TBU of the final noun within the conjoined subject DP. This shows that it is not the case that subjects are somehow immune from PHI. Rather, we posit, as have many others, that there is a phonological phrase boundary between a subject and following verb (as predicted by the structure in 49). This triggers PHI, but the docking of the High tone will be blocked in the very many cases where the subject is a third person singular or plural DP.

In this vein, we note here that the very same PHI pattern manifests itself in sentences containing a pre-posed object (cf. 37). In such cases, we again predict a phonological phrase boundary between the pre-posed noun and the following verb. When the verb begins with an underlyingly High-toned subject marker, as is the case in (52a), then PHI is blocked (cf. 48, 50), but when the subject marker is toneless as it is in (52b), then PHI applies (cf. 51).

- (52) Pre-posed Object (with co-indexed OM): DP_{OBJ}] Verb

- a. *Mù-lìmi bà-sá-mú-'líkánis-à.*
/mu-limi bá-sa-mú-likanis-a/
C1-farmer C2SM-PERS-C1.OM-copy-FV
'The farmer, they are still copying her/him.'
- b. *Bà-lìmi] ní-kà-bà-pòtòlòh-à.*
/ba-limi ni-ka-bá-pótoloh-a/
C2-farmer 1SG.SM-FUT-C2.OM-go.around-FV
'I will go around the farmers.'

Returning to subject DPs, as alluded to above, there are a small number of TAMPs which include a toneless morpheme that precedes the subject marker. We examine two here which have the morphological structure given below.

- (53) a. Past Progressive: *ne*-SM-Verb.Stem-*a*
b. Negative Present: *a*-SM-Verb.Stem-*i* (+ grammatical tone on the penult)

As shown below, in both of these TAMPs, the application of PHI turns out to be somewhat variable.

- (54) a. *Bà-lìmi né-bà-mát-à.*
/ba-limi ne-bá-mat-a/
C2-farmer TAMP-C2.SM-run-FV
'The farmers were running.'

- b. *Mù-àlìfì náà-mát-a.*
/mu-alifi ne-á-mat-a/
C1-doctor TAMP-C1.SM-run-FV
'The doctor was running.'
- c. *Bà-limí né-bà-mát-à.*
/ba-limi ne-bá-mat-a/
C2-farmer TAMP-C1.SM-run-FV
'The farmers were running.'
- d. *Lì-fitànzilà nè-lì-mát-a.*
/li-fitanzila ne-lí-mat-a/
C5-passerby TAMP-C5.SM-run-FV
'The passerby was running.'
- e. *Bà-limí nè-bà-líkánis-a.*
/ba-limi ne-bá-likanis-a/
C2-farmer TAMP-C2.SM-copy-FV
'The farmers were copying.'
- (55) a. *Bà-limí à-bá-líkánís-ì.*
/ba-limi a-bá-likanis-i +H_{penult}/
C2-farmer TAMP-C2.SM-copy-FV
'The farmers are not copying.'
- b. *Bà-limí à-bá-mát-i.*
/ba-limi a-bá-mát-i +H_{penult}/
C2-farmer TAMP-C2.SM-run-FV
'The farmers are not running.'
- c. *Mù-àlìfì à-á-líkánís-ì.*
/mu-alifi a-á-likanis-i +H_{penult}/
C1-doctor TAMP-C1.SM-copy-FV
'The doctor is not copying.'
- d. *Lì-fitànzilà à-lí-líkánís-i.*
/li-fitanzila a-lí-likanis-i +H_{penult}/
C5-passerby TAMP-C5.SM-copy-FV
'The passerby is not copying.'

First, we should note that while the High of the subject marker undergoes the regular shift and doubling process in the Past Progressive, the shift of High tones on subject markers is exceptionally blocked in a few TAMPs, including the Negative Present. In the Past Progressive examples we see that PHI has applied in (53a–c), but not in (53d–e). In the Negative Present we see that HTI has applied in (54a–b), but not in (53c–d). It is not immediately clear to us what causes this variation in sentences such as those in (53) and (54). In all of the phrases presented and

discussed in Sections 2–4, HTI is obligatory, where any lack of its application is directly attributable to the OCP-related constraints we have articulated this. As noted above, a number of closely related Bantu languages phrase subjects with the verb or use both patterns (in the case of Zulu), it is possible that variable phrasing of subjects could be an explanation for Silozi. This is a matter for further research.

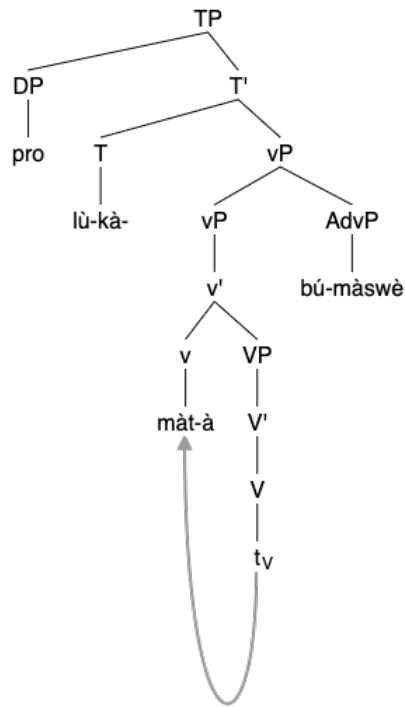
6 Prosodic behavior of adverbs

Let us finally turn our attention to adverbs and the tonological effects they have on the phrases they appear in. We have already seen two adverbs, those presented above in (6), which phrase together with the immediately preceding verb. They do not trigger PHI and a penult H will shift onto the ultima. Those and other adverbs which exhibit this tonal behavior are given below. The (a) examples show that no PHI is triggered, and the (b) examples show that a penult H undergoes Tone Shift.

- | | | | | |
|------|----|----------------------------------|---|----------------------------|
| (56) | a. | <i>Lù-kà-màt-à hàhúlu.</i> | ‘We will run a lot.’ | /lu-ka-mat-a hahúlu/ |
| | b. | <i>Lù-kà-lút-á há'húlu.</i> | ‘We will teach a lot.’ | /lu-ka-lút-a hahúlu/ |
| (57) | a. | <i>Lù-kà-màt-à bù-màswè.</i> | ‘We will run poorly.’ | /lu-ka-mat-a bu-maswe/ |
| | b. | <i>Lù-kà-lút-á bú-màswè.</i> | ‘We will teach poorly.’ | /lu-ka-lút-a bu-maswe/ |
| (58) | a. | <i>Lù-kà-màt-à hànyínyàni.</i> | ‘We will run a little.’ | /lu-ka-mat-a hanyínyani/ |
| | b. | <i>Lù-kà-lút-á há'nyínyàni.</i> | ‘We will teach a little.’ | /lu-ka-lút-a hanyínyani/ |
| (59) | a. | <i>Lù-kà-màt-à zàzì ní zàzì.</i> | ‘We will run every day.’ (lit. ‘day and day’) | /lu-ka-mat-a zazi ní zazi/ |
| | b. | <i>Lù-kà-lút-á zàzì ní zàzì.</i> | ‘We will teach every day.’ | /lu-ka-lút-a zazi ní zazi/ |

The proposed structure of (56a) is given in (60).

(60)



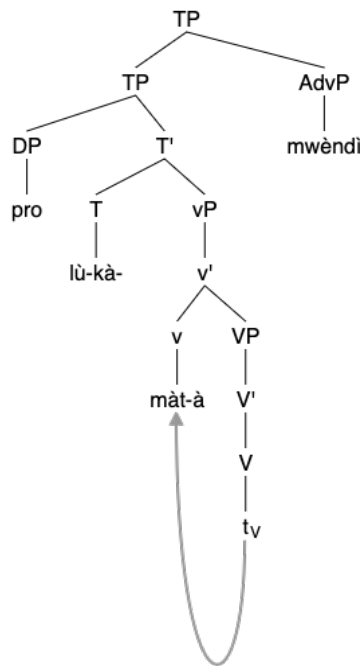
The adverbs in (58–61) are mostly low manner adverbs such as ‘poorly’, which we expect to attach inside the vP. The verb raises to vP in transitive clauses, leaving VP empty (following Larson 1988) and thus not leading us to expect a phonological phrase boundary between the verb and adverb.

Not every adverb, however, exhibits the patterns seen in (56–59). We now turn to adverbs which exhibit a very different pattern, which we account for by positing that they do not phrase with the immediately preceding verb. As seen in the examples below, PHI is triggered (seen in the (a) examples) and a penult H does not undergo shift onto the ultima (seen in the (b) examples). As we have seen in many cases already presented, this pattern is completely predicted when there is a phonological phrase boundary between the two words.

- (61) a. *lù-kà-màt-á*] *mwèndì* ‘perhaps we will run’ /lu-ka-mat-a mwendi/
 b. *lù-kà-lút-á*] *mwèndì* ‘perhaps we will teach’ /lu-ka-lút-a mwendi/
- (62) a. *lù-kà-màt-á*] *ònàfà* ‘we will run right now’ /lu-ka-mat-a onafa/
 b. *lù-kà-lút-á*] *ònàfà* ‘we will teach right now’ /lu-ka-lút-a onafa/

The proposed structure of (61a) is given below.

(63)



Unlike the manner adverbs which are generally assumed to attach to the extended verb phrase, modal adverbs like ‘perhaps’ are standardly assumed to attach to a higher syntactic position (TP or CP), thus our predication would be for a phonological phrase boundary to separate these from the verb. Note though that some of the adverbs in both sets are temporals which would also be expected to adjoin to a higher position (generally TP rather than vP) than manner adverbs.

Some adverbs, however, seem to exhibit a behavior different from those that clearly phrase with the preceding verb (56–59) and those which clearly do not (61–62). The adverbs presented and discussed below do not trigger PHI, generally an indication that they phrase with the preceding verb. However, a penult H on the preceding verb does not shift to the ultima, generally an indication that the two words belong to different phonological phrases. We consider these adverbs in two groups. The first group contains seven adverbs and is presented below in (64–65).

- | | | | |
|---------|----------------------------|------------------------|-----------------------|
| (64) a. | <i>lù-kà-màt-à hándè</i> | ‘we will run well’ | /lu-ka-mat-a hánde/ |
| b. | <i>lù-kà-màt-à cwále</i> | ‘we will run now’ | /lu-ka-mat-a cwále/ |
| c. | <i>lù-kà-màt-à hápè</i> | ‘we will run again’ | /lu-ka-mat-a hápe/ |
| d. | <i>lù-kà-màt-à kápìlì</i> | ‘we will run soon’ | /lu-ka-mat-a kápìli/ |
| e. | <i>lù-kà-màt-à kámùsò</i> | ‘we will run tomorrow’ | /lu-ka-mat-a kámuso/ |
| f. | <i>lù-kà-màt-à kábùnyà</i> | ‘we will run slowly’ | /lu-ka-mat-a kábunya/ |
| g. | <i>lù-kà-màt-à fókùmù</i> | ‘we will run often’ | /lu-ka-mat-a fókùmù/ |

- | | | | |
|---------|-----------------------------|--------------------------|-----------------------|
| (65) a. | <i>lù-kà-lút-á 'hándè</i> | ‘we will teach well’ | /lu-ka-lút-a hánde/ |
| b. | <i>lù-kà-lút-á 'cwálè</i> | ‘we will teach now’ | /lu-ka-lút-a cwále/ |
| c. | <i>lù-kà-lút-á 'hápè</i> | ‘we will teach again’ | /lu-ka-lút-a hápe/ |
| d. | <i>lù-kà-lút-á 'kápili</i> | ‘we will teach soon’ | /lu-ka-lút-a kápili/ |
| e. | <i>lù-kà-lút-á 'kámùsò</i> | ‘we will teach tomorrow’ | /lu-ka-lút-a kámuso/ |
| f. | <i>lù-kà-lút-á 'kábùnyà</i> | ‘we will teach slowly’ | /lu-ka-lút-a kábunya/ |
| g. | <i>lù-kà-lút-á 'fókùmù</i> | ‘we will teach often’ | /lu-ka-lút-a fókùmù/ |

In (64), no PHI occurs, and in (65), the root High does not shift of the penult H of the verb onto the final (but does undergo doubling onto it). The forms in (65) suggest that there is a phonological phrase boundary between the verb and these adverbs, accounting for the lack of shift. But what about the forms in (64)? While the lack of PHI does often signal that the two words in question are part of the same phonological phrase, that is not always the case. We saw above in (39) that a High-initial adverb blocked PHI on a previous noun (direct object) over a phonological phrase boundary. The tonology of the phrases in (64), then, could be made consistent with the claim that they always begin a new phonological phrase if we simply generalize that PHI never occurs before a High-initial adverb, regardless of the part of speech of the immediately preceding word.

In terms of their semantics these should include both higher and lower adverbs, as represented in (60) and (63) respectively. As with subjects, the patterns across Bantu are mixed: postverbal adverbs phrase separately from the verb in Shingazija (Patin 2016), but with the verb in Rutooro (Clemens and Bickmore 2020), and in Xhosa, unless the verb is in the disjoint form (Jokweni 1995).

One might ask what an analysis would look like if we assumed that the adverbs in (64–65) phrased *with* the preceding verb. Of course, the forms in (64) are directly accounted for as no PHI would be expected when the two words phrase together. But what about the lack of Shift in (65)? Might the lack of shift be due to OCP considerations as all these adverbs begin with a High tone? In the few examples presented above of shift onto the ultima (8b–d), the second word was a toneless noun. As seen below, however, shift onto the ultima does in fact occur (in violation of the OCP) when the following noun begins with a High tone.

- | | | |
|---------|-------------------------------|-------------------------|
| (66) a. | <i>kù-bòn-á 'nóhà</i> | /ku-bón-a nóha/ |
| | ‘to see the snake’ | |
| b. | <i>lù-kà-bùlùk-á 'shákàmè</i> | /lu-ka-búluk-a shákame/ |
| | ‘to keep the hare’ | |

Thus, while there can certainly be no general prohibition on shift to the ultima when a following word begins with a High, we have seen in Section 3 that in order to determine whether PHI is blocked by the OCP or not, the parts of speech of the two words in question must be considered. Given that, it does not seem unreasonable to posit that in Silozi the presence of a High-initial adverb (but not a noun) always blocks the shift of a penult H in the previous word onto the final, regardless of whether the two words phrase together or separately.

Two additional pieces of evidence might be relevant here. The first comes from the behavior of High toned /C/ shaped roots such as ‘eat’, introduced in (7a) and (8a), repeated below.

- (67) a. *kù-c-à* 'to eat' /c^H-a/
b. *kù-c-á bú-màswè* 'to eat poorly'

Since a High is prohibited on a pre-pausal TBU, it does not surface in (67a). But it will surface in (67b) when the verb-final TBU is not pre-pausal. As can be seen below in (68), the lexical H on the verb 'to eat' does not in fact surface on the verb-final TBU when the following adverb begins with a High tone. This, then is a second type of High tone forbidden to surface just before a High-initial adverb.

- (68) a. *lù-kà-c-à hápè* 'we will eat again'
b. *lù-kà-c-à hándè* 'we will eat well'

The second piece of evidence comes from verbs with a Melodic High tone which docks onto the FV (cf. 14–15) exemplified in the subjunctive forms below where the verb is followed by a noun object.

- (69) a. *lù-líkánìs-é bà-tù* 'we should copy the people'
b. *lù-lúmélìs-é bá-lìmì* 'we should greet the farmers'

In (70) we present subjunctive forms before adverbs of the type included in (64–65).

- (70) a. *lù-líkánìs-è hápè* 'we should copy again'
b. *lù-líkánìs-è kápìlì* 'we should copy soon'
c. *lù-líkánìs-è kápìlì* 'we should copy soon'

As can be seen, the Melodic High tone does not in fact surface on the Final Vowel. Thus, it seems possible to generalize that before a H-initial adverb, no H is allowed to surface on the final TBU of the immediately preceding word (except when it is due to Doubling), whether that H is a lexical H (68), a Melodic High (70), or one generated by PHI (65).

To conclude this section, we consider one final set of adverbs, illustrated below in (71) and (72).

- (71) a. *lù-kà-màt-à kàcénu* 'we will run today' /lu-ka-mat-a kacénu/
b. *lù-kà-màt-à cwàni* 'how we will run' /lu-ka-mat-a cwani/
c. *nè-bà-líkánìs-à mààbáni* 'they were copying yesterday' /ne-bá-likanis-a maabáni/

(72) a. *lù-kà-lút-á kàcénu* 'we will teach today' /lu-ka-lút-a kacénu/
b. *lù-kà-lút-á cwàni* 'how we will run' /lu-ka-lút-a cwani/
c. *nè-lú-bá-'lút-á mààbáni* 'we were teaching them yesterday' /ne-lú-bá-lút-a maabáni/

In (71) we see that there is no Phrasal High Insertion. As each adverb begins with a Low tone, it does not seem possible to appeal to the OCP to motivate this. Thus, the simplest explanation is that, as was the case in (56–59), the adverb phrases with the immediately preceding verb. In (72), however, we see that there is no shift of the penult in the verb onto the final, suggesting that the two words phrase separately. While these are the same patterns we just saw in (64–65), the

adverbs in (71) and (72), as just noted, begin with a Low tone, which presents a very different challenge in determining the prosodic phrasing. Let us consider each possibility.

First, is it possible to posit that these three adverbs phrase with the preceding verb? This would directly account for the forms in (71) as we would not expect PHI to apply. But positing that the two words phrase together predicts that the penult H in (72) should shift onto the final, but it does not. We suggested above for the forms in (64–65) that it would be possible to posit that the two words phrase together if we assumed a constraint that shift onto the final was blocked by an adverb beginning with a High tone. But that is simply not the case in the three verbs in (71–72). What about positing that the adverb phrases separately from the verb in these forms. That directly predicts the lack of shift of the penult H onto the final in the forms in (72). But it predicts that PHI should apply in (71), yet it does not. As we have forms such as those in (24), (27), (29), (31), and (34), where an adverb beginning a new phonological phrase triggers PHI on the immediately preceding word, it is simply not clear how one would prevent PHI from applying in (71).

While, as noted above, both patterns for adverbs as phrasing separately or together with the verb are found in Bantu, in Silozi these do not neatly map onto syntactic differences between high or low adverbs, or to placement in different positions as evidenced by conjoint/disjoint patterns.

7 Summary and conclusion

In this paper we have presented a sizable number of Silozi phrases of different lengths and syntactic structures, which exhibit a complex set of surface tonological patterns. We argue that these patterns cannot be accounted for either purely syntactically or purely phonologically. In fact, the required phonological rules have been shown to be sensitive to 1) the syntactic structure of the phrase, 2) the grammatical class of the words present, and 3) the location of the various High-toned TBUs. We account for the syntactic effects within the framework of Match Theory where phonological phrase edges are determined by the syntax. On the phonological side, we carefully examined the role of the OCP. Its application in Silozi is interesting in that it constrains some processes but not others. It does not block Tone Doubling, for instance, but it often blocks PHI. We have shown that PHI is a very complex process conditioned by multiple factors. First, it depends on whether the OCP violation with the inserted H due is due to an immediately preceding or immediately following existing High. Second, it was shown that whether the OCP ultimately blocks Tone Doubling or not depends in part on the part of speech of the words involved. In sum, there is a complex yet delicate interplay between the syntax and phonology which ultimately determines the various surface tone patterns.

In addition to providing a new description and analysis of Silozi phrasal data, we have also provided some typological comparisons with other Bantu languages. This was done in Section 5 on the phrasing of preverbal subjects, where it was noted that in some Bantu languages the subject phrases with the immediately following verb and in some languages it does not. We argue that the Silozi tonal patterns favour the latter analysis. Furthermore, in Section 6 we contrast the behaviour of adverbs in Silozi with those in related Bantu languages, with regard to the question as to whether the adverb phrases with an immediately preceding verb or not.

In conclusion, we have shown that the precise phrasing of adverbs in Silozi is quite complex. The proposed groups of adverbs, based on their phrasing patterns, are not easily explained based on shared semantics or expected syntactic positions as low or high adverbs. The intricate

interplay between syntax and phonology has been documented and analyzed, yet still leaves a small handful of unresolved questions which merit further research.

Abbreviations

AP	Adjectival Prefix
APPL	Applicative
ASS	Associative
C#	Noun Class #
COP	Copula
FUT	Future
FV	Final Vowel
H	High Tone
HTI	High Tone Insertion
OCP	Obligatory Contour Principle
OM	Object Marker
PERS	Persistent
PHI	Phrasal High Insertion
PRES	Present
PST	Past
SM	Subject Marker
TAMP	Tense/Aspect/Mood/Polarity
TBU	Tone Bearing Unit
UR	Underlying Representation

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