









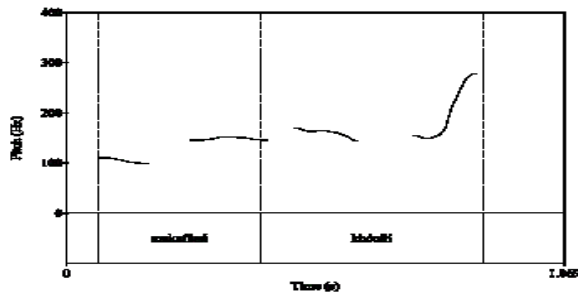




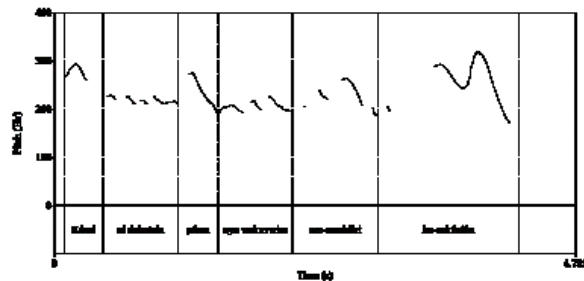
declarative counterpart, although the mean pitch values remain similar. The crucial difference between (13) and (14) is the pitch in the utterance-final word, *kwisoko*. In the polar question a high tone exists where there is none in the declarative and this high tone is higher than other high tones in the sentence.

**4. Description and analysis.** Chewa and Tumbuka also display polar question formation that on the surface is similar in some ways to what is observed in Kinyarwanda. In Chewa, polar questions have an obligatory fall-rise contour over the last two syllables of the question (15a), while Tumbuka polar questions have a high pitched fall-fall contour over the last two syllables (15b) (Downing & Mtenje 2011):

- (15) a. mu-ku-fúná khóofíí? (Downing & Mtenje 2011)  
 2PL-TAM-want coffee  
 ‘Do you want coffee?’



- b. káasi, ni dokotala péera uyo wa-ku-vwira mu-sambízi ku-sukúulúu?  
 Q COP 1.doctor only 1.REL 1SBJ-TAM-help 1-teacher LOC-school  
 ‘Does only the doctor help the teacher at the school?’

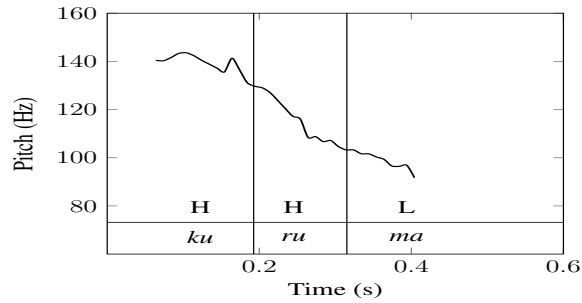


I will show that polar question formation cannot be accounted for with a rule inserting some intonational contour as it can in Chewa and Tumbuka. The phonological process is actually quite different. Rather than simply targeting the penultimate syllable for the shift in tone, the target of the prosodic manipulation in Kinyarwanda is connected to the location of underlying lexical tones within the utterance. My main claim is that Kinyarwanda targets the rightmost lexical high tone in the utterance as the edge of a prosodic domain. That edge is then marked by raising the high tone that is already there.

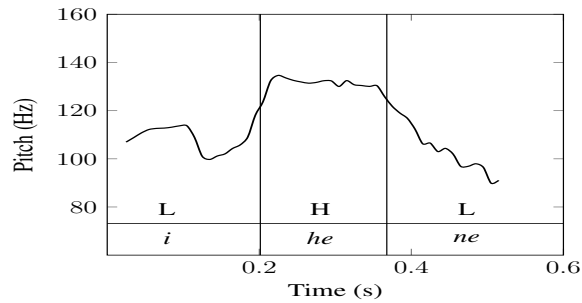
4.1. PATTERNS OF PROSODIC MANIPULATION. (16), (17), and (18) show the tonal patterns of three individual words that will be used in a sentence. Because of tone anticipation, the lexically low infinitive marker in (16) inherits the high tone from the verb stem, resulting in a HHL intonational pattern. The only other lexical high tone is the second syllable of (17). These words do not contain any long vowels, so there is no opportunity for a phonetic contour

tone surfacing. Each word contains three moras, and thus there is a maximum of three tones that could surface in these words.

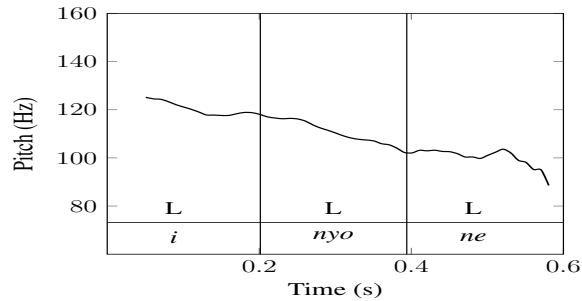
- (16) *kú-rúm-a*  
 INF-bite-ASP  
 'to bite'



- (17) *i-héne*  
 9-goat  
 'goat'

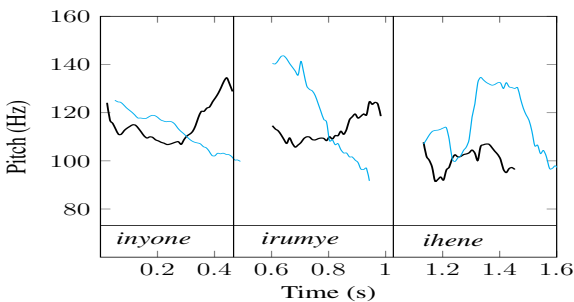


- (18) *i-nyone*  
 9-bird  
 'bird'



The lexical tones of these words in isolation differ from the tones that surface when they are used in an utterance. This supports the hypothesis that the right edges of prosodic words in Kinyarwanda are marked with a high tone while the right edge of the utterance is marked by deleting any high tones that may have existed. This is outlined in Section 2.3.

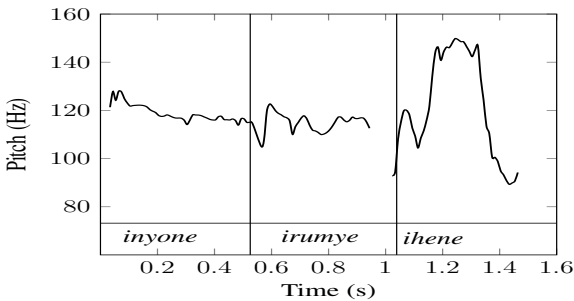
- (19) *i-nyoné i-rum-yé i-héne*  
 9-bird 3SG-bite-ASP 9-goat  
 'The bird bites the goat.'





Each successive high tone in (19) is downstepped resulting in the lowering of high tones as the sentence progresses. In the question counterpart in (20), the word final high tones do not appear, and the final word of the sentence has an extra high (or raised high) tone.

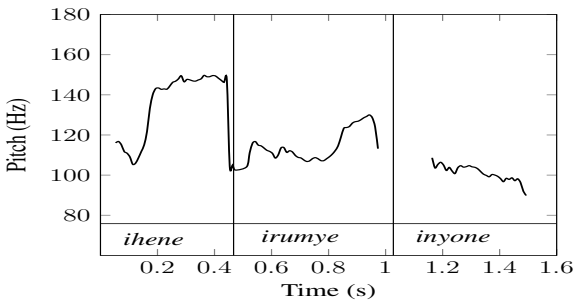
- (20) i-nyone i-rum-ye i-héne  
 9-bird 3SG-bite-ASP 9-goat  
 ‘Does the bird bite the goat?’



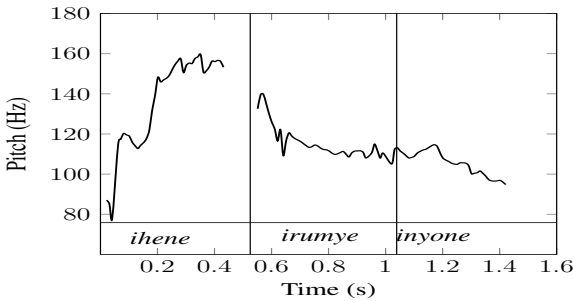
I will claim that the reason for the suppression of the word-final high tones in (19) and the raising of the lexical high tone in (20) is due to the creation of a prosodic domain ranging from C to the rightmost lexical high tone in the utterance. The high tone on the right edge of this domain also undergoes suspension of downstep.

A key reason that a local phonological process targeting the penultimate syllable of the utterance is inadequate to account for polar question formation comes from the fact that if we minimally change (19) so that the nominal with the high tone is in the subject position rather than the object position, the intonational contour of the question no longer resembles a rule that targets the penultimate syllable.

- (21) i-héné i-rum.yé i-nyoni  
 9-goat 3SG-bite-ASP 9-bird  
 ‘The goat bites the bird.’



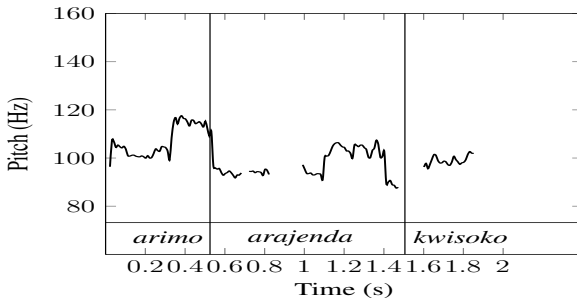
- (22) i-hěné i-rum-ye i-nyoni  
 9-goat 3SG-bite-ASP 9-bird  
 ‘Does the goat bite the bird?’



Because in these sentences the arguments only have one surface level high tone, we can observe here that high tone is raised in a question, regardless of where it occurs in the sentence. It is important to note that the verb in (19) and (21) also has a high tone that is not raised because it is a phrasal tone and not a realization for lexical tone. When there are multiple lexical high tones in the sentence, downstep is suspended and the rightmost high tone is raised to a higher pitch than lexical tone.

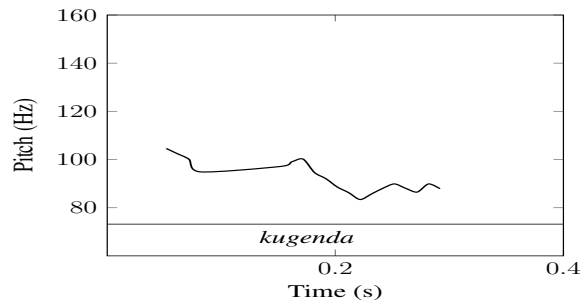
Similar to the situation described in Jita, when there are no lexical high tones in the utterance the penultimate syllable is targeted for the high tone. (13) is repeated below as (23).

- (23) a-rimó a-ra-jend-á kwi-soko  
 3SG-PROG 3SG-PROG-go-ASP LOC-market  
 ‘S/he is going to the market.’

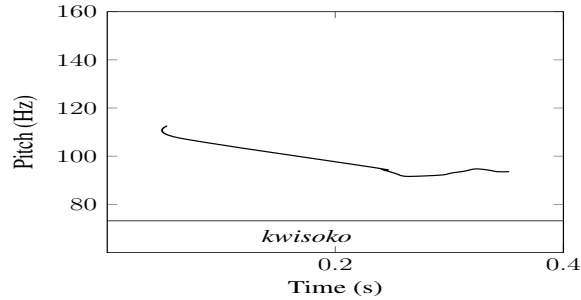


In this example, the only high tones that surface are those that mark the right edge of prosodic words. Individually, the verb and the nominal in object position do not have any high tones. The auxiliary *arimo* is difficult to categorize as it is mostly a function word and does not contribute lexical content. I am going to assume it doesn't have lexical tone, but gets the high tone observed here from a tonological operation having to do with tense.

- (24) ku-genda  
 INF-go  
 ‘to go’

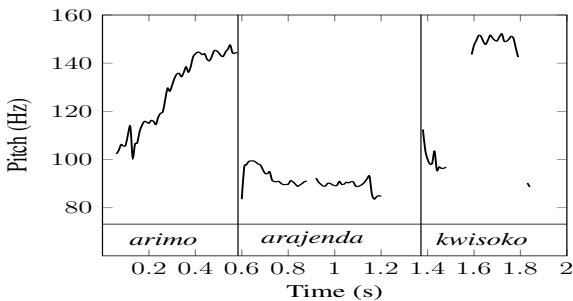


- (25) kwi-soko  
 LOC-market  
 'to the market'



When (23) is made into a question, a high tone emerges in the penultimate syllable even though there is no lexical high tone in that location.

- (26) a-rimó a-ra-jend-a kwi-sóko  
 3SG-PROG 3SG-PROG-go-ASP LOC-market  
 'is s/he going to the market?'



This polar question looks prosodically very similar to the others where lexical high tones exist. The high tone marking the right edge of the prosodic word on the verb is deleted and an extra high tone surfaces on the penultimate syllable. The finding that the penultimate syllable is the target of the high tone where no lexical high tones are present is not surprising. First, high tones in the utterance final position are not attested in Kinyarwanda, so the penultimate syllable is the rightmost possible target for the high tone. Second, this process is very similar to what is observed in Jita by Downing (1989). Recall that Jita polar questions with no lexical high tones raise the pitch of all syllables through the penult. Kinyarwanda seems to form polar questions in an analogous way to Jita. Where Jita raises the pitch of all syllables through the rightmost lexical high, Kinyarwanda raises only the rightmost lexical high. When no lexical high tones are present, Jita raises all syllables through the penult and Kinyarwanda raises only the penult.

4.2. THEORETIC ACCOUNT. The question remains as to why Kinyarwanda creates a prosodic domain between the complementizer and rightmost lexical high tone (C marking the left edge of the prosodic domain and the rightmost lexical high marking the right edge). To account for this, I will adopt a version of Richards (2010)'s analysis of *wh*-question prosody. This will require deviating from polar question in Kinyarwanda to a brief explanation of *wh*-question formation.

A central claim of Richards (2010) is that all languages are trying to create a prosodic structure for *wh*-questions in which the *wh*-phrase and the corresponding complementizer are separated by as few prosodic boundaries as possible:

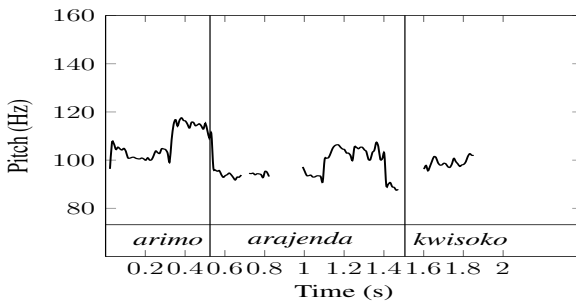
(27)  $[\phi \text{ C}] [\phi] [\phi] [\phi \text{ wh}] \rightarrow [\phi \text{ C} \quad \text{wh}]$

Languages can either accomplish this by combining multiple phonological phrases to create one prosodic domain that contains both C and the wh-word (wh-in-situ), or with overt movement. For instance, Chichewa has initial complementizers and Minor Phrase boundaries to the right of certain XPs. Kinyarwanda is like Chichewa in that it has the possibility for wh-in-situ. Following Richards (2010), the ability for wh-in-situ should mean that the language has both initial complementizers and marks the right edges of XPs as prosodic boundaries. I have already shown in Section 2.3 that Kinyarwanda marks the right edges of words as prosodic words, and we see that Kinyarwanda also has initial complementizers:

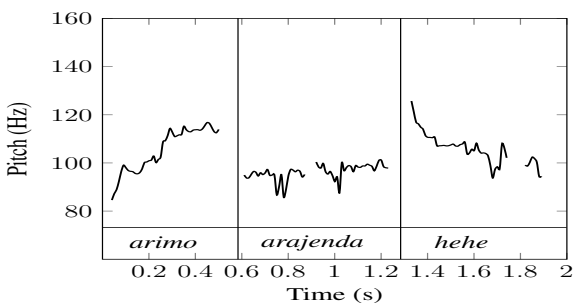
(28) *nda-nézewe ko a-ta-kuvúga*  
 1SG-be.happy C 3SG-NEG-talk  
 ‘I’m happy that he doesn’t talk.’

The complementizer *ko* that introduces the embedded clause appears at the left edge of that clause. This combination of initial C, prosodic boundaries at right edges, and wh-in-situ means that Kinyarwanda should also create some prosodic domain that includes both C and the wh-word. This is indeed the case, and the prosodic domain that Kinyarwanda forms between C and the wh-word resembles a prosodic pattern found in Japanese.

(29) *a-rimó a-ra-jend-á kwi-soko*  
 3SG-PROG 3SG-PROG-go-ASP LOC-market  
 ‘S/he is going to the market.’



(30) *a-rimó a-ra-jend-a he-he*  
 3SG-PROG 3SG-PROG-go-ASP where-RED  
 ‘Where is s/he going?’



The prosodic patterns of wh-questions in Kinyarwanda mirror those of polar questions, except for the fact that polar questions lack an overt wh-word. Rather than a wh-word that serves as the target for the high tone, polar questions must rely on some other part of the utterance.

Because Kinyarwanda marks the right edge of prosodic words with a high tone, the simple transitive sentence in (19) can be parsed into the following prosodic phrases:<sup>1</sup>

- (31) [<sub>φ</sub> i-nyoné ] [<sub>φ</sub> i-rum-yé ] [<sub>φ</sub> i-héne ]  
 9-bird 3SG-bite-ASP 9-goat  
 ‘The bird bites the goat.’

Here the right edge of each prosodic word is marked with a boundary tone, but the utterance final boundary tone is deleted as was noted in Section 2.3.

In a polar question, rather than targeting a wh-word with a high tone, instead the target becomes the rightmost lexical high tone. Because Kinyarwanda does not have rightward tone spreading, the next best option for creating the largest prosodic domain possible between C and the right edge of the utterance is the rightmost lexical high tone that exists in the sentence. We see this in the polar question counterpart:

- (32) a. [<sub>φ</sub> C i-nyoné ] [<sub>φ</sub> i-rum-yé ] [<sub>φ</sub> i-héne ]  
 9-bird 3SG-bite-ASP 9-goat  
 ‘Does the bird bite the goat?’  
 ↓  
 b. [<sub>φ</sub> C i-nyone i-rum-ye i-héne ]

In (32a), each prosodic word is grouped in its own prosodic domain with a boundary tone marking the right edge (this is the declarative). To form the polar question in (32b), the domain between C and the rightmost lexical high is grouped into a single prosodic phrase. This means that there are no longer prosodic boundaries between the individual words and thus there are no boundary tones.

The pitch track in (32) shows that the observed tonological pattern fits this analysis. All boundary tones are suppressed and the rightmost lexical high tone is raised. The prosodic domain established in the polar question construction is highlighted.

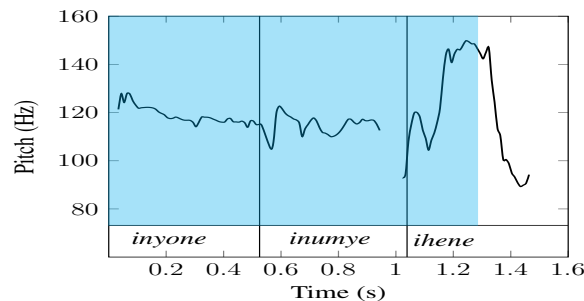


Figure 1. Prosodic domain of Kinyarwanda polar questions

4.3. FURTHER DISCUSSION AND IMPLICATIONS. One possible explanation for the suppression of lexical high tones that serve as the right edge of the prosodic domain of polar questions has to do with contrast. Because the manipulation of tone is the only way to distinguish declaratives and polar questions in Kinyarwanda, speakers may accentuate those tonal manipu-

<sup>1</sup>For Richards the Minor Phrase is the lowest level of phonological phrasing that can occur. It is not especially important for my analysis what these prosodic phrases are labeled as, so I am calling them prosodic words as they correspond with syntactic word boundaries.

lations in order to ensure polar questions are interpreted as separate from declaratives.

Another possibility for avoiding raising the verb-final tone in polar questions is to disambiguate any tonological functions within the prosodic domain that contains the raised high tone. Tone in Kinyarwanda serves lexical, grammatical, and prosodic roles. In addition to this, tones often spread/shift, and are added and deleted. Because verbs in Kinyarwanda already bear such a great tonological burden, it may increase the functional load of the verb too much to add another tonological process that isn't reliant on an already-present tone.

**5. Conclusion.** In this paper I have provided a detailed descriptive generalization of polar question formation in Kinyarwanda and shown that the rightmost lexical high tone is raised for utterances with at least one lexical high tone, and the penultimate syllable is raised for utterances with no lexical high tones. This places Kinyarwanda within a greater typological system of polar question formation in Bantu languages. I have shown that polar questions in Kinyarwanda pattern in a very similar way to Jita and that the differing tonological operations available to these languages can account to the observable differences in polar question formation.

An interesting finding of this work is that Kinyarwanda forms a prosodic domain with a syntactic position as one edge and a phonological feature as the other edge. The complementizer is certainly a syntactic position, but the rightmost lexical high tone is not. Having the rightmost lexical high tone serve as a boundary of the prosodic domain suggests that speakers want the biggest possible domain, but must rely on an already existing tone to mark its edge.

More work needs to be done with regards to whether there is a minimum or maximum size to this prosodic domain. I have found that polar question formation in Kinyarwanda is a much more complicated process than a simple phonological rule stipulating a floating or spreading tone, or a rise-fall contour at the end of the utterance. It may be the case that polar question formation in other Bantu languages are also more complicated than meets the eye, and could benefit from further analysis of how tonological operations apply with certain syntactic boundaries.

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