

# PROSODIC STRUCTURE AND INTONATION IN KOASATI

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## ABSTRACT

This paper provides a description of prosodic structure and intonational properties of Koasati, an endangered Muskogean language spoken by approximately 300 people in Louisiana and Texas. Words in Koasati group into Accentual Phrases (AP), which are characterized by an initial and final high tone. Accentual Phrases in turn combine to form Intonational Phrases (IP), which are defined by a final boundary tone: L% (or for certain speakers LH%) in statements, H% in questions, and HL% in commands. In addition to intonational tones, Koasati also has tonal accents of three types. First, there is lexical tone associated with certain nouns and certain verbal affixes. Second, tone is used morphologically to convey aspectual distinctions in verbs. Finally, predictable accents may dock on the penultimate syllable of the stem and on heavy syllables (those containing a long vowel or a coda sonorant).

**Keywords:** Koasati, Muskogean, intonation, prosody, pitch accent.

## 1. INTRODUCTION

Koasati is a Muskogean language spoken in Louisiana and Texas by about 300 speakers, the majority of whom live in Louisiana (approximately 250 speakers). Language use is most prevalent among speakers over the age of 50, although there are a few people in their 20's who are able to understand and converse in Koasati.

Although there is a grammar [3] and dictionary [4] of Koasati, there are virtually no published descriptions of prosody in Koasati apart from brief discussions of stress and pitch accent in [3, 4] and a more recent analysis of accent and metrical structure in [2]. This paper is thus the first study devoted to Koasati prosody, focusing in particular on intonation and prosodic structure in the variety of Koasati spoken by speakers from Louisiana.

## 2. METHODOLOGY

This study is based on a combination of qualitative observations about Koasati prosody made over several years of fieldwork on the language as well a series of elicited recordings targeting particular properties of the prosodic system for both qualitative and quantitative study. The targeted recordings consisted of elicited word lists and sentences recorded from multiple speakers (both male and female) designed to illustrate the features of lexical tone, phrasal intonation patterns, and prosodic constituency. In addition, recordings of two narratives were consulted for further insight into intonation and prosodic structure. The primary data consulted were all recorded at a sampling rate of 44.1kHz onto a Marantz (PMD 661) solidstate recorder using a handheld unidirectional Sennheiser microphone.

## 3. RESULTS

### 3.1. Prosodic structure

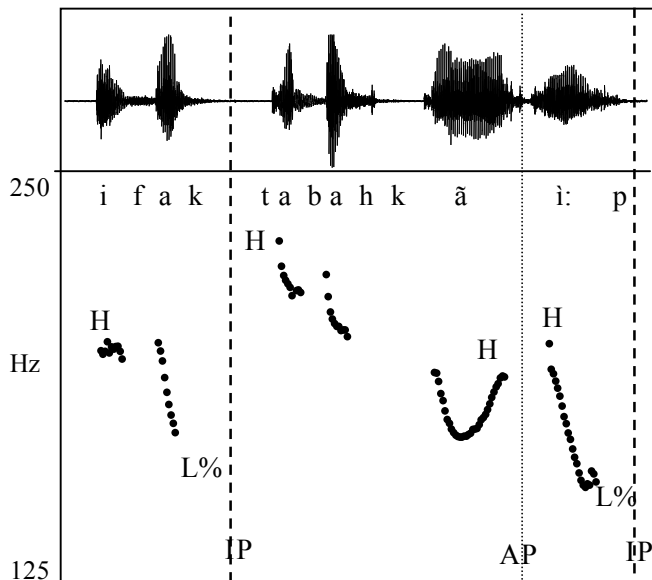
The smallest readily identifiable prosodic unit is the prosodic word, which is the domain of stress assignment. Primary stress in Koasati falls on the first syllable of a word and is associated with the highest F0 and greatest intensity in the word.

There are at least two tonally defined prosodic units identified thus far. The smaller of these, the Accentual Phrase (AP), is characterized by an initial and final high tone, though either of these tones may be superseded by a lexical or morphological tone (see 3.3). The Accentual Phrase is typically isomorphic to the prosodic word, though it is possible for monosyllabic or disyllabic words to fuse together into a single Accentual Phrase. The Intonational Phrase (IP) consists of one or more Accentual Phrases and is characterized by a terminal boundary tone, which may be either simple or bitonal (see 3.2).

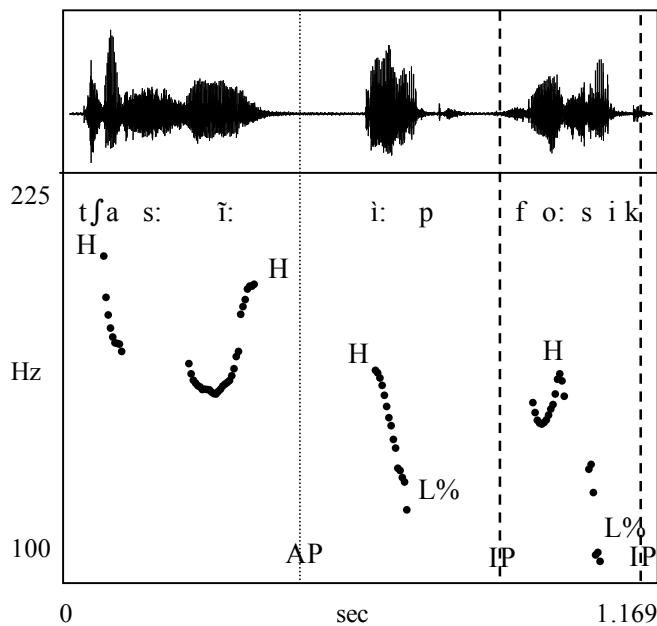
Sentences in Koasati are characteristically verb-final, where the verb is IP-final. A preverbal object

and the verb typically belong to separate Accentual Phrases within a single IP. The subject of a sentence usually forms its own IP independent of a following object or verb. Phrasing in an SOV sentence is illustrated in Figure 1. Post-verbal arguments form a separate IP from the preceding verb and are realized with a compressed pitch range (Figure 2).

**Figure 1:** Prosodic phrasing and L% in /ifa-k tabahkã ì:p/ (dog-subj + bread + eat) ‘The dog is eating the bread’.



**Figure 2:** Prosodic phrasing in /tʃas:ĩ ì:p fo:si-k/ (corn + eat + bird-subj) ‘The bird is eating corn’.



### 3.2. Boundary tones

We have identified four IP-final boundary tones. A low boundary tone (L%) is found at the end of statements (Figures 1 and 2). Questions, both polar and informational, have a high boundary tone (H%) (Figure 3). Imperatives are characterized by a high-to-low terminal F0 fall analyzable as bitonal HL% (Figure 4). The HL% is truncated to H% if the final syllable ends in a voiceless consonant. We have also observed a terminal LH% boundary tone in statements for certain speakers (Figure 8), where the final H% target is lower in frequency than the H% characteristic of questions.

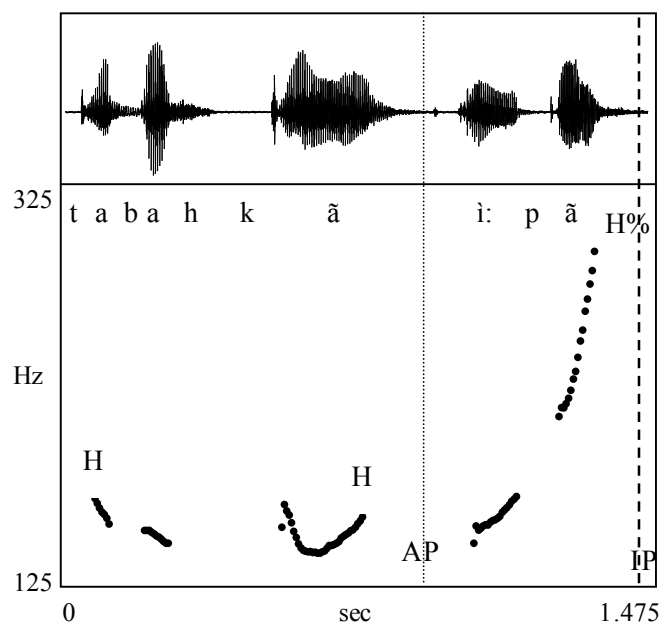
### 3.3. Pitch accents

#### 3.3.1. Lexical and morphological accents

The most salient F0 events not linked to prosodic boundaries are the lexical and morphological tones, which are similar in their phonetic realization and their distribution. We mark them with “μ” to distinguish them from phonological pitch accents marked with “\*” (section 3.3.2), but often use the term “accent” to refer to all three non-boundary tones due to their shared characteristics.

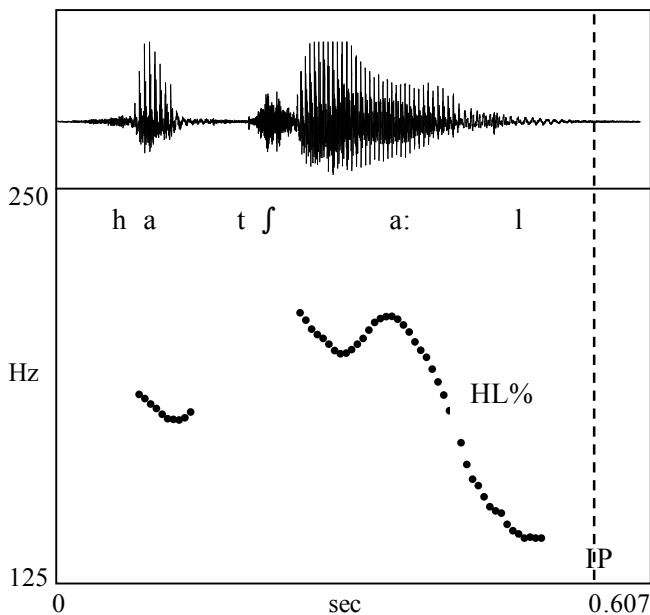
Lexical tone is associated with certain nouns and is phonetically realized as a low-high (LH) rise that starts at the beginning of the syllable and reaches its high target late in the syllable or early in the next syllable (Figure 5). Lexical tones are largely limited to penults with a long vowel or a sonorant coda.

**Figure 3:** H% in /tabahkã ì:pã/ (bread + eat) ‘Is s/he eating the bread?’.



In verbs, tone serves two purposes. First, there are certain suffixes that lexically carry a high tone. The second source of tone in verbs is aspect, which is distinguished largely through differences in F0. For example, a common aspectual distinction is between the L-grade used to mark events (either in the past or present) and the G-grade, which signals resulting states, e.g. L-grade /i:sí-/ ‘take’ vs. G-grade /ĩ:si-/ ‘hold’. Both aspects are realized with a rising pitch profile aligned with the penultimate syllable of the stem (which often becomes stem-final on the surface due to apocope), though the timing of the rise differs between the two cases. The G-grade parallels lexical tone in nouns in consisting of a LH $\mu$  sequence realized on the stem penultimate syllable (Figure 6). In the L-grade, the F0 trough falls at the end of the penult (on a coda consonant or the latter half of a long vowel) and the F0 peak aligns with the following syllable (Figures 5 and 7), a timing pattern that is consistent with a L $\mu$ +H analysis.

**Figure 4:** HL% in /hatf a:l/ ‘Stand up!’.

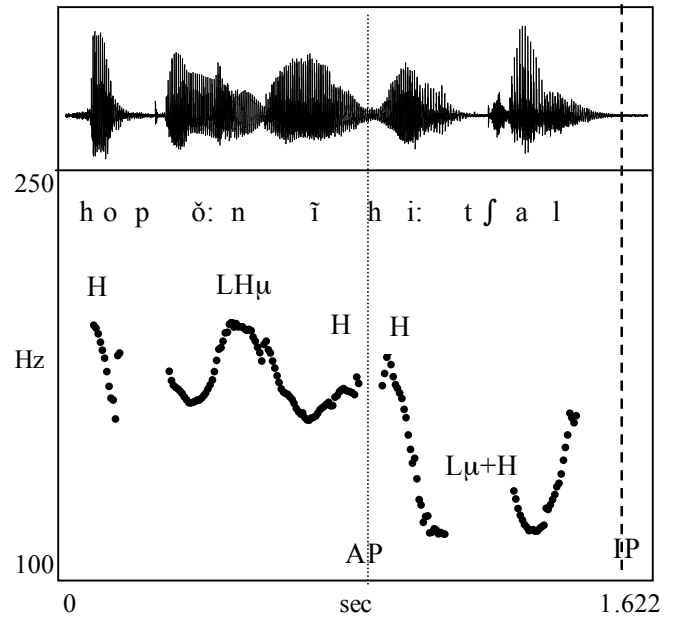


### 3.3.2. Phonological accents

There is also evidence in verbs for pitch accents that are attributed to neither lexical nor morphological tone. The penultimate syllable of the verb root is a recurring docking site for these phonological pitch accents. The attraction of pitch accents to the penult is consistent with the docking site of lexical and morphological accents and may be regarded as a position of metrical prominence, at least diachronically [1, 5] and plausibly synchronically as

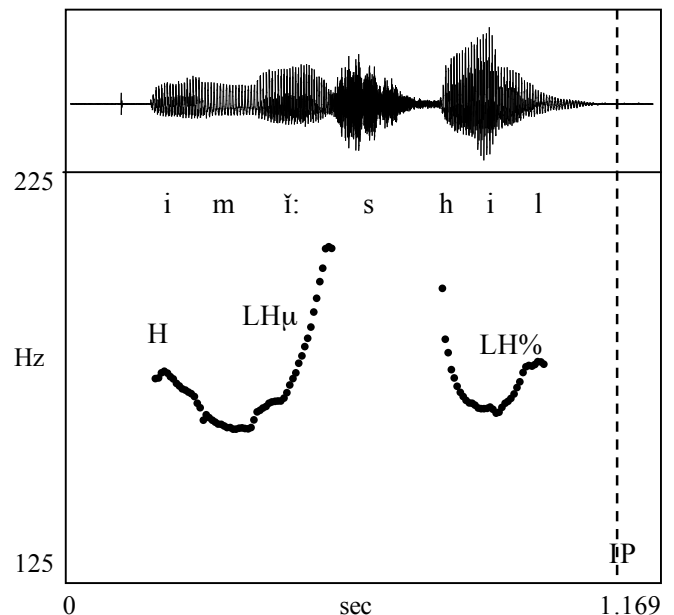
well. Most verbs have a pitch accent, whether a morphological one (i.e. a tone) or a phonological one, on the penultimate syllable of the root.

**Figure 5:** Lexical LH $\mu$  in /hopð:nĩ/ ‘cook’ and morphological L $\mu$ +H in /hì:tʃá:l/ in /hopð:nĩ hì:tʃá:l/ (cook + seeLgr -1sg) ‘I see the cook’.

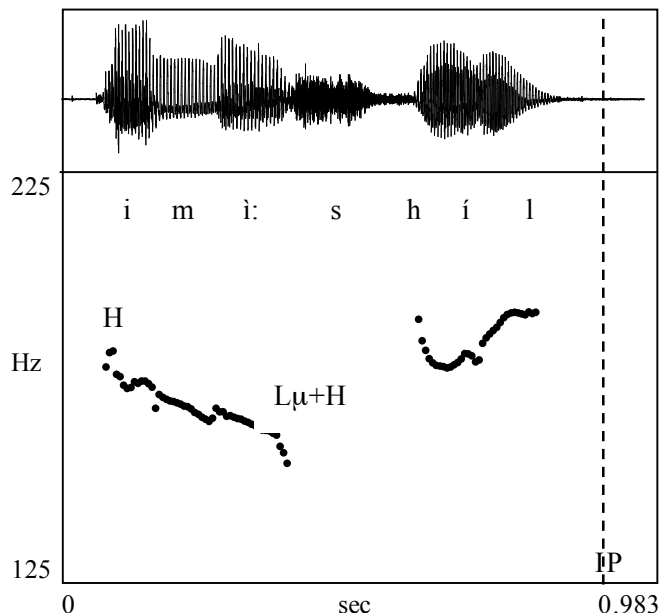


In statements, the phonological pitch accent is a high tone falling on or after the penult preceded by a low tone, a pattern analyzable as L+H\* (Figure 8).

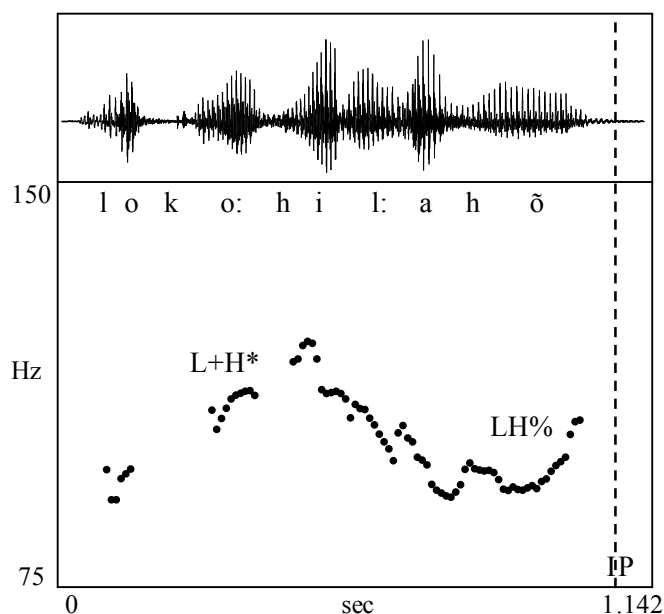
**Figure 6:** LH $\mu$  accent in G-grade /imĩ:s-hil/ (takeGgr-1pl) ‘We’re holding it for him’.



**Figure 7:** L $\mu$ +H in L-grade /imì:s-hí/ (takeLgr-1pl) ‘We’re taking it from him’.



**Figure 8:** L+H\* accent and LH% in /loko:hil-lahō/ (stand up-lpl-future) ‘We’ll stand up’.



### 3.4. Pitch Scaling

Table 1 contains average F0 values associated with different types of tone targets, including boundary tones, phrasal tones, and morphological and phonological pitch accents. Data are from four speakers (two female and two male) and represent averages of between six and nine tokens from elicited sentences.

**Table 1:** Mean F0 values (in Hz) for pitch targets produced by four speakers.

Tone	Speaker			
	F1	F2	M1	M2
H%	282	268	130	156
L(H)%	145(179)	124	92 (112)	112
HL%	210-132	215-128	119-95	153-106
H	202	168	126	130
H*	201	208	127	125
LH $\mu$	170-215	168-199	95-120	114-127
L $\mu$ +H	141-277	135-179	98-120	104-120

The H% and (H)L% boundary tones are generally associated with the highest and lowest pitch targets, respectively. Speakers F1 and M1 employ bitonal LH% in statements; for both, the H% target is higher in F0 than high tones from other sources. The two female speakers display greater pitch excursions for the L+H than for the LH morphological accents, likely due to the former being realized over two syllables. The males, on the other hand, have similar F0 differences between L and H for the two accents.

## 4. SUMMARY

Tonal events in Koasati have different sources. Tone is used lexically in nouns and verbal suffixes and to convey aspect in verbs. Verbs may also have one or more predictable phonological pitch accents. Lexical, morphological, and phonological accents are all associated with a LH contour on the penultimate syllable of the root, although the timing of the L and H varies as a function of the accent’s source. Phrase boundaries also contribute tones. The Accentual Phrase is associated with H tone at both of its edges, while the Intonational Phrase has a right-edge tone that varies according to the semantic properties of the phrase.

## 5. REFERENCES

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