Consonants and tones: A view from two Tibeto-Burman languages.

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Segments and Tone: Issues

- The relationships between segments and tones have posed an interesting challenge to phonological theorization (Yip 2002)

  - There do not seem to be any languages in which tones are contrastive on consonants.

  - F0 differences due to phonological tonal contrasts manifest themselves most clearly during vowels.

  - These observations seem to suggest that tones should be phonologically associated with vowels.

Segments and Tone: Issues

- Consonants can interact with tones in non-trivial ways:

  - Only H-tones are allowed after aspirated consonants in Dränjongke (van Driem 2001).

  - Consonants need to have some relationship with tonal features (cf. Bradshaw 1992)

- Lee's (2008) proposal:
  - (i) tones can be directly associated with consonants phonologically, but
  - (ii) there are no faithfulness constraints that protect underlying tonal specifications on consonants.

Segments and Tone: Issues

- Predictions by Lee's xTBU theory (2008):

  - Consonants can be tonal targets at the phonetic level, a prediction which remained to be tested.
  - Testing the targets is possible when we look into syllables with a sonorant onset.

Aims

- We report phonetic data from two Tibeto-Burman languages—Dzongkha and Dränjongke—which show that this prediction made by Lee (2008) is in fact born out.

- We propose phonological representations that account for the tonal realization patterns in these languages, and develop an Optimality Theoretic (Prince & Smolensky 2004) analysis to derive these representations.

Phonetic data

- Our on-going research on Dränjongke and Dzongkha (both Tibeto-Burman languages) has examined the tonal realization patterns in CV-syllables (Lee et al. 2018a, b).

- In syllables such as [na] and [la], both Dränjongke and Dzongkha speakers show a clear f0 separation between H-toned and L-toned syllables during onset sonorant intervals.

- Some speakers of Dränjongke even neutralize the difference during the vowel intervals.
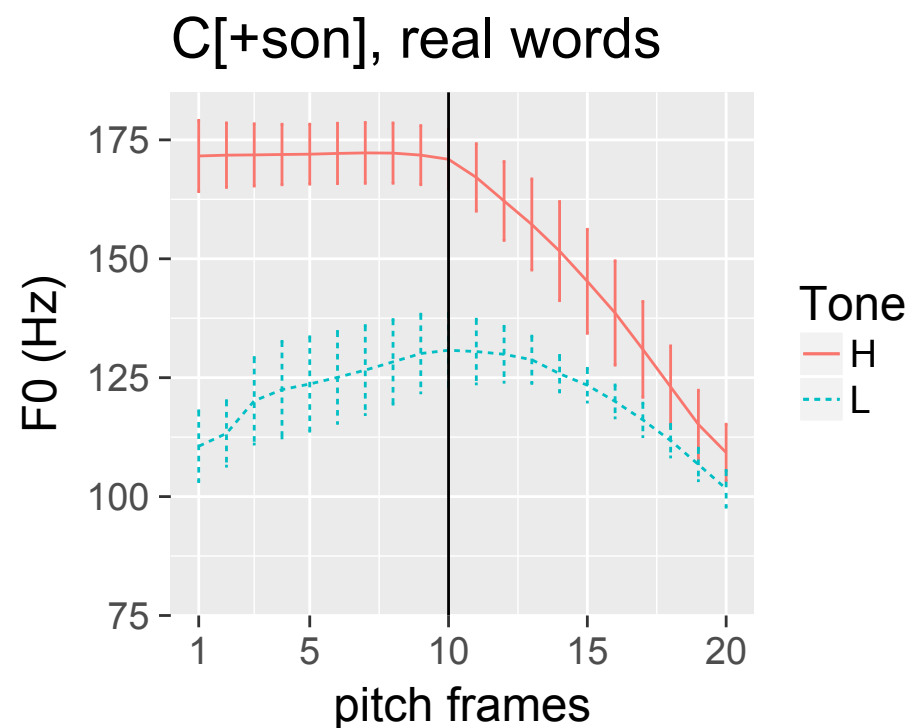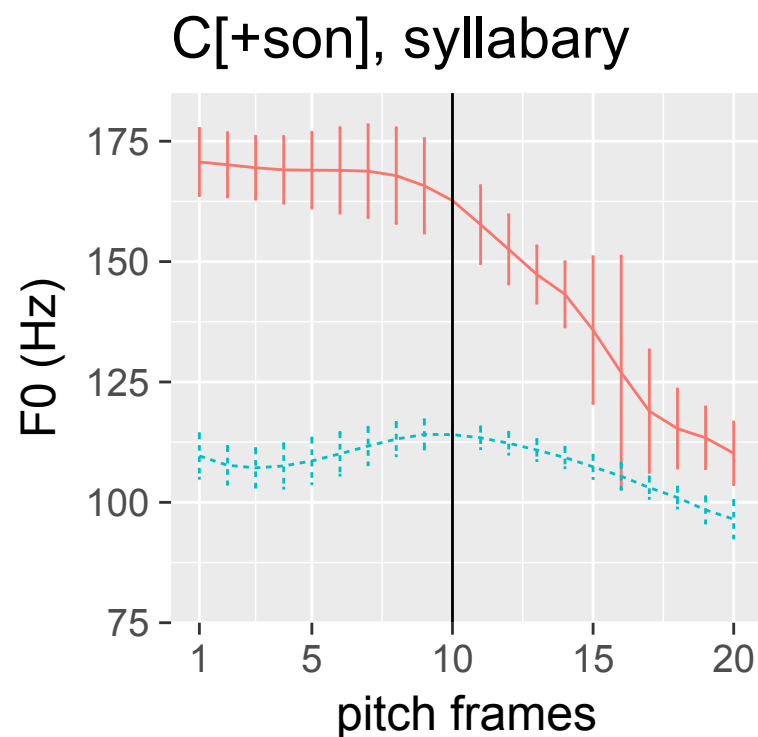
Dränjongke (Lee et al. 2018a)

- Much of the difference between the H-toned and L-toned tokens appears during the consonantal syllables (the first 10 pitch frames)

- For Speakers 2, 3, 5, 6, 8, 9, 10, the f0 differences appear to be neutralized—not observed—during the vocalic intervals (the last 10 pitch frames).
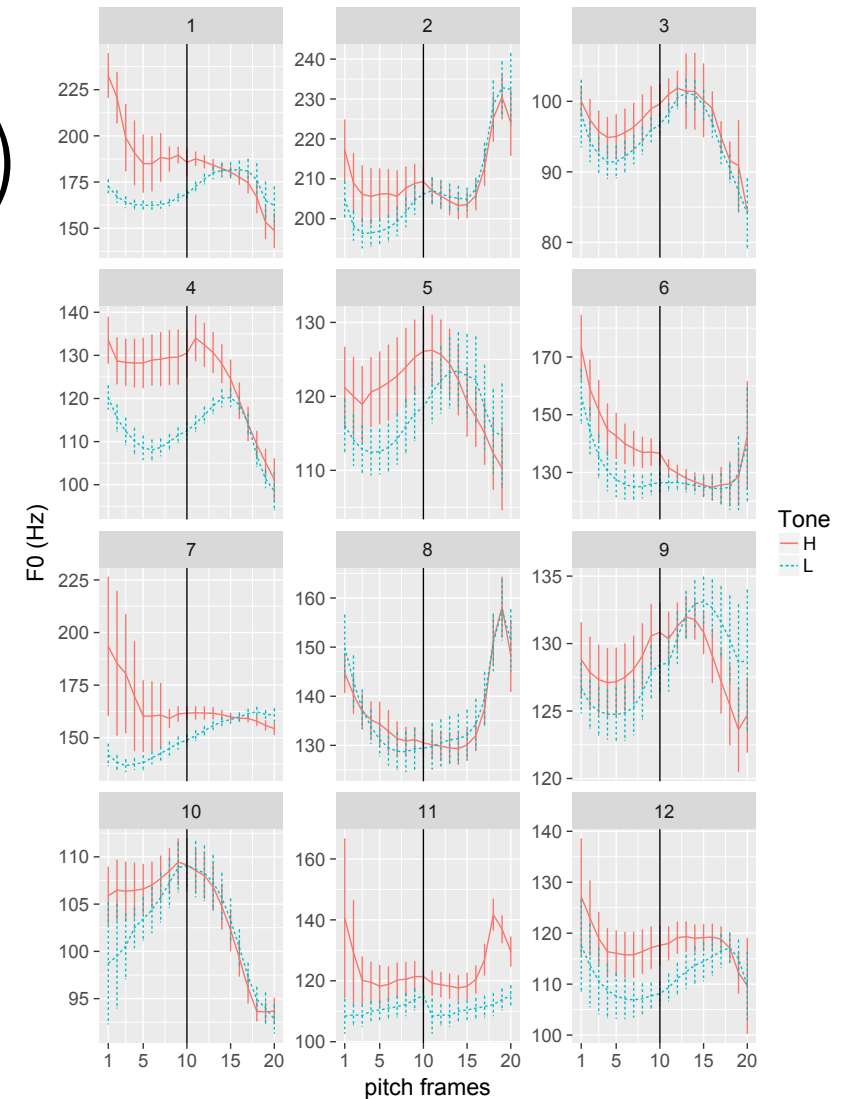
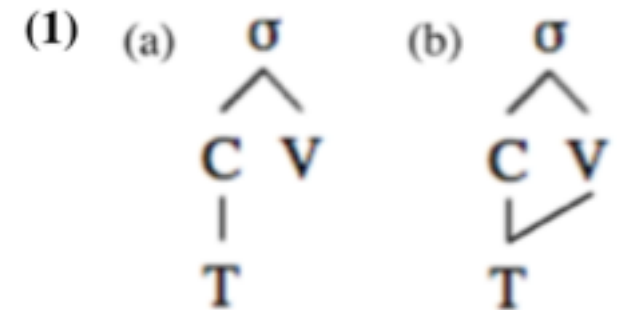# Dzongkha (Lee et al. 2018 b):
Analysis of sounds in van Driem & Tschering (2015)

Proposal: Phonological representation

- (1a) for those speakers who show tonal differences during consonants only

- (1b) for those speakers who show f0 differences during both consonants and vowels.

(1) (a)   σ   (b)   σ

         C V   C V

         |
         T   T

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# Proposal: Phonological representation

- Both in Dzongkha and Dränjongke, different types of obstruents affect the f0 of the following vowels in different ways.

    - In both languages, for example, f0 is higher next to aspirated consonants than next to voiced consonants.
    - We propose that these patterns also follow from the representation in (1a).

An OT analysis: Constraints

- ALIGN-L(T, σ)
  - An alignment constraint which requires tonal features to be aligned with the left edge of syllables.

- TONETOVOWEL
  - A constraint that requires tonal features to be associated with a vowel.

- *MULTIPLELINK
 - A constraint that prohibits autosegmental multiple-linking.

An OT analysis: Ranking for C[+son]V syllables

- The ranking ALIGN-L(T, σ), *MULTIPLELINK ≫ TONETOVOWEL yields the representation in (1a)

- The ranking ALIGN-L(T, σ), TONETOVOWEL ≫ *MULTIPLELINK yields the representations in (1b)

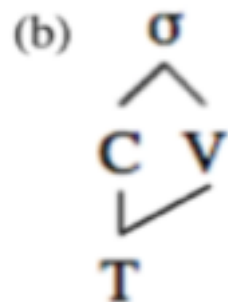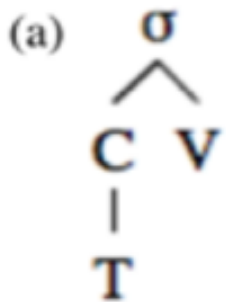- The ranking *MULTIPLELINK, TONETOVOWEL ≫ ALIGN-L(T, σ) yields the representations in (1c)

(1) (a)   σ   (b)   σ
           ∧   ∧
          C V   C V
          | ∨
          T   T
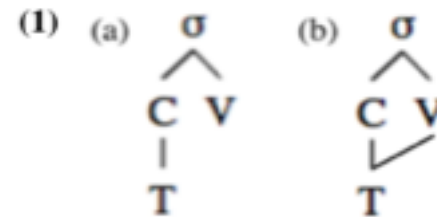
An OT analysis: Ranking (1a) as the winner

		ALIGN-L(T, σ)	*MULTIPLELINK	TONETOVOWEL
->	(a)			*
	(b)		* W	L
	(c)	* W		L

(a)

(b)
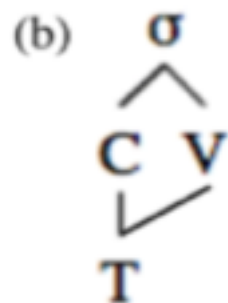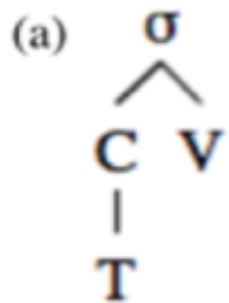
An OT analysis: Ranking (1b) as the winner

		Align-L(T, σ)	ToneToVowel	*MultipleLink
	(a)		* W	L
->	(b)			*
	(c)	* W		L

(a) σ
C V
|
T

(b) σ
C V
T

An OT analysis: Ranking (1c) as the winner

|		*MULTIPLELINK	TONETOVOWEL	ALIGN-L(T, σ)
	(a)		* W	L
	(b)	* W		L
->	(c)			*
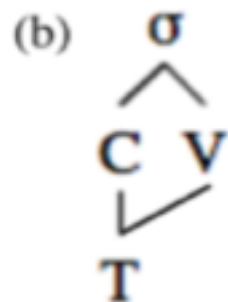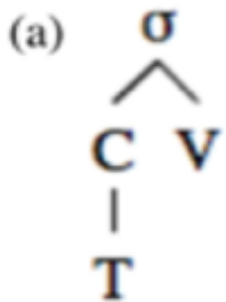
F0 in $C_{[-son]}V$ syllables

An OT analysis: Ranking for C$_{[-son]}$V syllables

- Two other constraints
  - A constraint that coerces particular types of obstruents to have particular tonal features (e.g. aspirated consonants need to be associated with H-tone: AspToHigh).

  - A constraint that requires tonal features be associated with some [+son] segments (ToneToSon).

- These constraints dominate *MultipleLink, thereby forcing the C$_{[-son]}$V syllables to have the representation in (1b).

An OT analysis: Ranking C$_{[-son]}$V syllables

		AspToHigh	Align-L(T, σ)	ToneToSon	*MultipleLink	ToneToVowel
	(a) pʰa			* W	L	* W
->	(b) pʰá				*	
	(b') pʰà	* W			*	
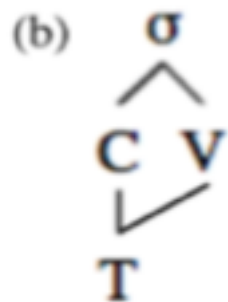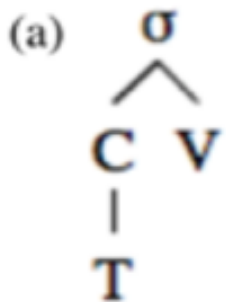
- (a) High tone is linked to the onset consonant only.
- (b) High tone is linked to the onset and the vowel (i.e. the syllable).
- (b') Low tone is linked to the onset and the vowel (i.e. the syllable).

Discussion

- Tang
- Perkins
- Bradshaw

ABC-Q theory (Inkelas & Shih)

- How to account for consonant-tone interaction without an autosegmental representation.

Conclusion

- Complex interactions of violable constraints account for the tonal manifestation patterns in the two Tibeto-Burmese languages.

Acknowledgements

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