

# The Nonequivalence of Phonological Categories and Phonetics in Burmese

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# Phonology and Phonetics

## ∞ Categorical Phonology vs. Gradient Phonetics

### ∞ Interaction (Cohn and Chitoran 2009, 32-33):

- (i) phonetic detail is directly encoded in the phonology (e.g., Steriade 2001; Flemming 1995/2002, 2001; Kirchner 1998/2001)
- (ii) phonetic detail (phonetic naturalness) is only relevant in the context of diachronic change (e.g., Ohala 1981 and subsequent work; Hyman 1976, 2001; Blevins 2004)
- (iii) phonetic detail is indirectly reflected in phonological constraints, by virtue of phonetic grounding (e.g., Hayes 1999; Hayes and Steriade 2004)

### ∞ Equivalency:

- Articulatory Phonology (Browman and Goldstein 1986 *et seq.*)

# Phonology and Duration

- ∞ A number of studies have shown that syllable weight is correlated with duration
  - Japanese (Port et al. 1987)
  - Mandarin and Shanghai Chinese (Duanmu 1994)
  - Bantu (Hubbard 1995)
  - Hungarian (Ham 1998)
  - Hindi, Malayalam, Jordanian Arabic and Levantine Arabic (Broselow et al. 1997)
  - English (Cohn 2003)

# Goals

- ☞ Given the complicated nature of the relationship between phonology and phonetics, what – if anything – can phonetics tell us about phonological structure?
- ☞ In particular, is it possible to use phonetic evidence to differentiate between two possible analyses of Burmese word structures?
- ☞ Duration results do correlate with one proposed structural analysis for Burmese. Whether this is the correct structure is an open question.

# Burmese

- ☞ Sino-Tibetan
- ☞ 32 million speakers
- ☞ Tonal (Four contrastive tones)
  - High/level: á
  - Low/heavy à
  - Creaky ǎ
  - Checked/stop aʔ
- ☞ Sesquisyllables
- ☞ Extended sesquisyllables



# Sesquisyllables

- Word type which is a syllable and a half in length (Matisoff 1973)



Minor Syllable	Major Syllable
May only contain [ə]	May contain any vowel except [ə]
Must be open	May be open or closed
Does not bear tone	Bears tone
Only has a simplex onset	May have a simplex or complex onset
Must be monomoraic/light	Must be bimoraic/heavy

# Sesquisyllables

## ☞ Monomorphemic

- k<sup>h</sup>ə.louʔ ‘knob’
- pə.lwè ‘flute’
- kə.lɛʔ ‘be wanton’

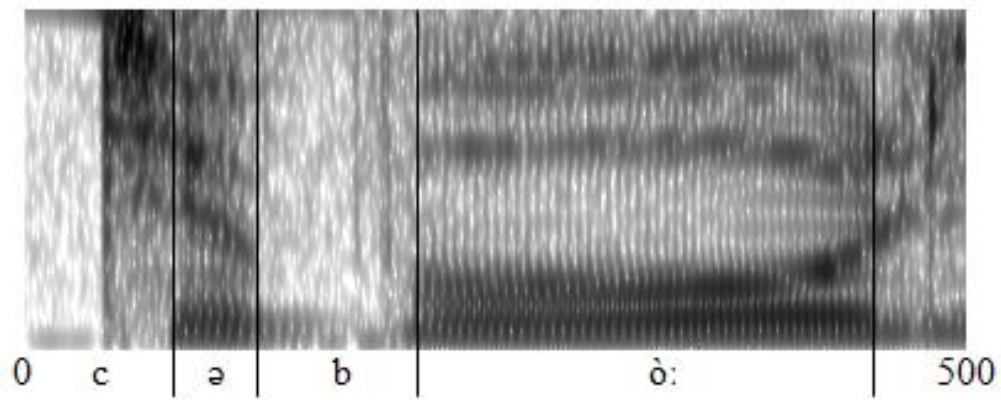
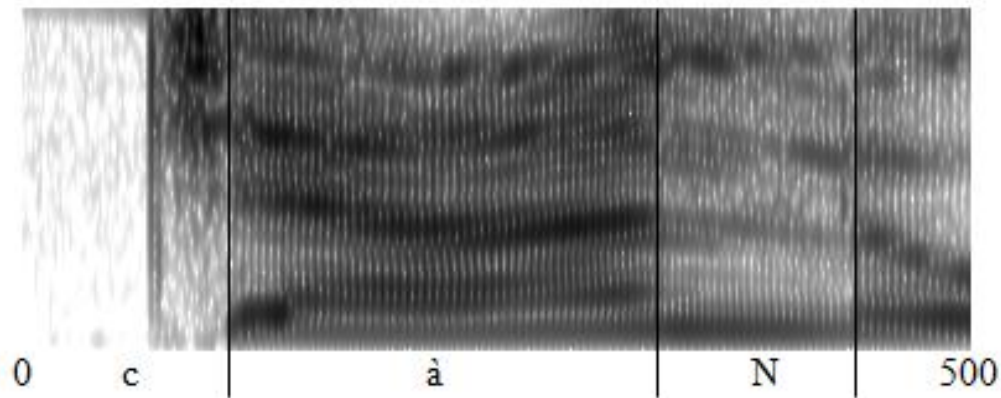
## ☞ Polymorphemic

- |                  |              |   |                |                   |
|------------------|--------------|---|----------------|-------------------|
| ○ <u>ŋ</u> ə.ʔú: | ‘fish spawn’ | < | /ŋà:/ + /ʔú:/  | ‘fish’ + ‘egg’    |
| ○ <u>θ</u> ə.jé: | ‘saliva’     | < | /θwà:/ + /jé:/ | ‘tooth’ + ‘juice’ |
| ○ <u>n</u> ə.nɔ: | ‘milk’       | < | /nwà/ + /nɔ/   | ‘cow’ + ‘udder’   |

(Green 2005, Okell 1969)

# Sesquisyllables

☞ /cə.bò:/ 'bug' < /càN/ + /pò:/ 'floor' + 'insect'



# Extended Sesquisyllables

☞ Word types with one major syllable preceded by two minor syllables, which in Burmese are subject to the same markedness restrictions.

☞ Examples (Matisoff 2003)

- khə.mə.lek            'lick'                            Tangkhul Naga
- sbrul < \*s-b-ru:l    'snake'                            Written Tibetan
- pǎ.sǎ.wi             'plaid cloth'                    Jingpho                            (contested)

☞ Burmese (Green 2005)

- [thə.mə.jé:] 'rice-water'            < [thə.mìN] + [jé:]            'rice' + 'water'
- [kə.lə.bjé:] 'India'                            < [kə.là:] + [bjé:]            'Indian' + 'country'

# Structure of the ES

## ☞ Green (2005)

- ☞ All feet in Burmese are maximally one heavy trochaic syllable. Otherwise, Burmese would allow (L L) feet.

- (pàN) 'flower'
- zə.(bwé) 'table'
- thə.mə.(jé:) 'rice-water'

## ☞ Butler (2012)

- ☞ Sesquisyllables are disyllabic iambs, so Burmese contains both monosyllabic and disyllabic feet.

- (pàN) 'flower'
- (zə.bwé) 'table'
- thə.(mə.jé:) 'rice-water'

# Phonological Support

## ∞ Other reasons to prefer the disyllabic footing

- Cross-linguistic tendency to disfavor multiple adjacent unfooted syllables
- Data from other languages suggest that a phonological structure is needed which can support a three-way markedness distinction. Because this is a phonological distinction (not just a phonetic one), there must be some phonological structure which licenses it.

# Pervasiveness of \*LAPSE

<u>Syllable adjacency</u>	<u>Foot adjacency</u>
Gordon (2002), Alber (2005) Rhythm is alternating; no two adjacent unstressed syllables.	Kager (1994), Ishii (1996) Of every two stress units one must be parsed into a foot.
Elenbaas and Kager (1999) Every weak beat must be adjacent to a strong beat or the word edge.	Green & Kenstowicz (1995), de Lacy (2004) Adjacent unstressed moras or syllables must be separated by a foot boundary.
Selkirk (1984) Any weak position on a metrical level $n$ may be preceded by at most one weak position on that level.	

# SMI Trique

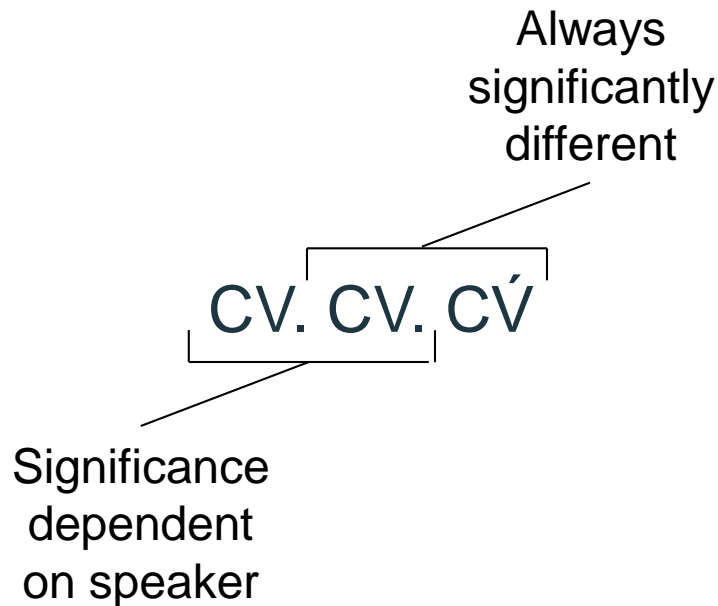
- ☞ Oto-Manguean (Mexico)
- ☞ Tonal
- ☞ Morphological words may be one, two or three syllables
- ☞ “The general pattern here is one of increasing phonological contrast toward right edge of the morphological word.” (DiCanio 2008, 52)
- ☞ Examples
  - [ra.(ru.'βa)]            ‘breakfast’
  - [ru.(ni.'ʔja)]            ‘tejocote fruit’

# Questions

- ∞ Markedness differences suggest Green (2005) is correct, but do the phonetics corroborate this?
- ∞ **If** the phonetics and phonology line up,
  - Similar phonetic values for both minor syllables suggest the footing Cv.Cv.(CVC).
  - Large differences in phonetic values between minor syllables suggest the footing Cv.(Cv.CVC).

# Duration and Prominence

- ☞ Preface: Chitoran and Hualde (2007)
- ☞ Distance from stress has a significant effect on segment duration for vowels in Romance languages.

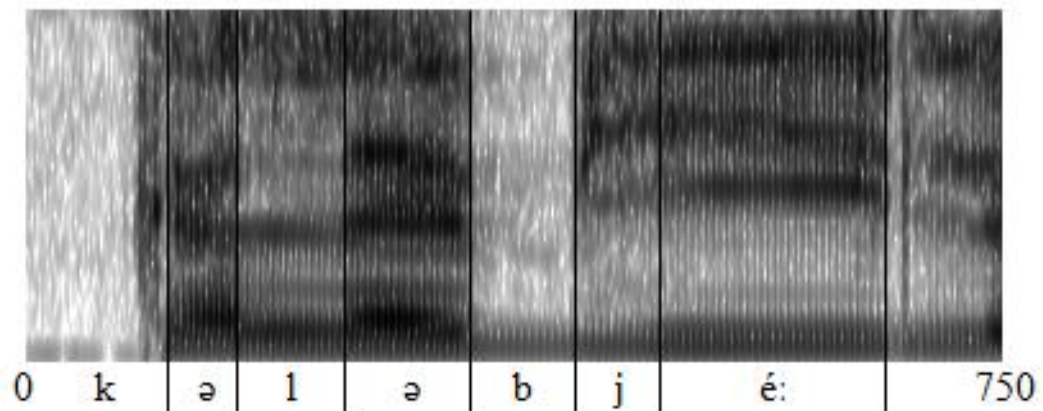
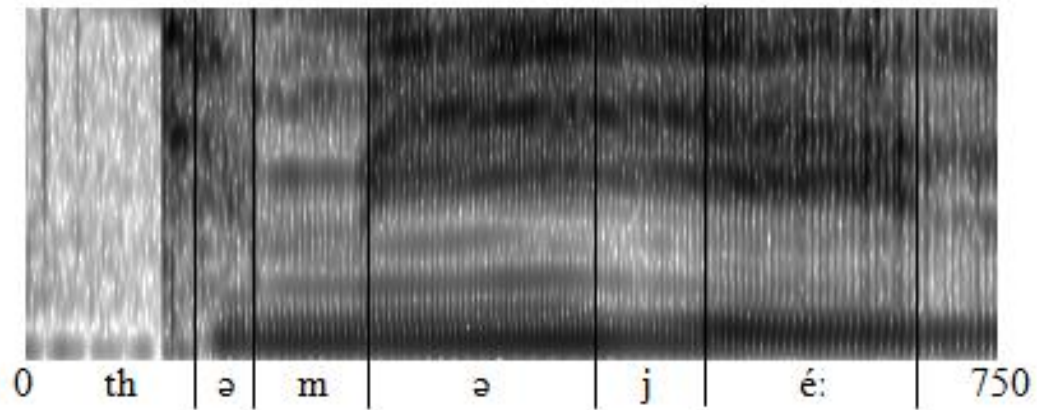


- ☞ Does this also hold for non-stress prominence?

# Experiment

- ☞ Pilot study containing two stimuli:
  - [thə.mə.jé:] 'rice-water'
  - [kə.lə.bjé:] 'India'
- ☞ Five native speakers of Burmese, ages 21 – 60 ( $\mu = 39$ )
- ☞ Recorded in Cornell Phonetics Lab
- ☞ Six repetitions of each stimulus, in a frame sentence

# Results



# Duration Results

- ☞ Green (2005)
- ☞ Footing: Cv.Cv.(CVC)
- ☞ Duration: [Cv.Cv].[CVC]

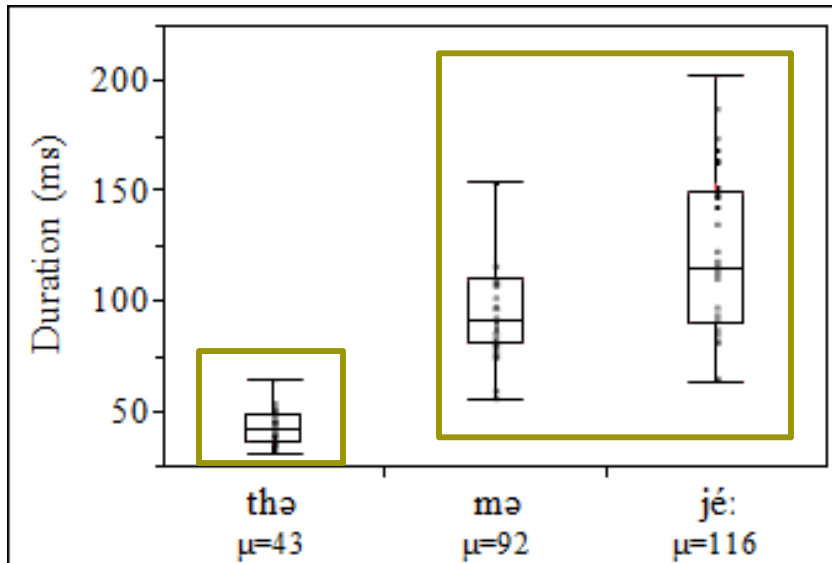
Speaker	thə	mə	je:
M2	44	87	93
M1	48	88	84
F1	45	174	176
M3	35	85	128
F2	52	97	125

- ☞ Butler (2012)
- ☞ Footing: Cv.(Cv.CVC)
- ☞ Duration: [Cv].[Cv].[CVC]

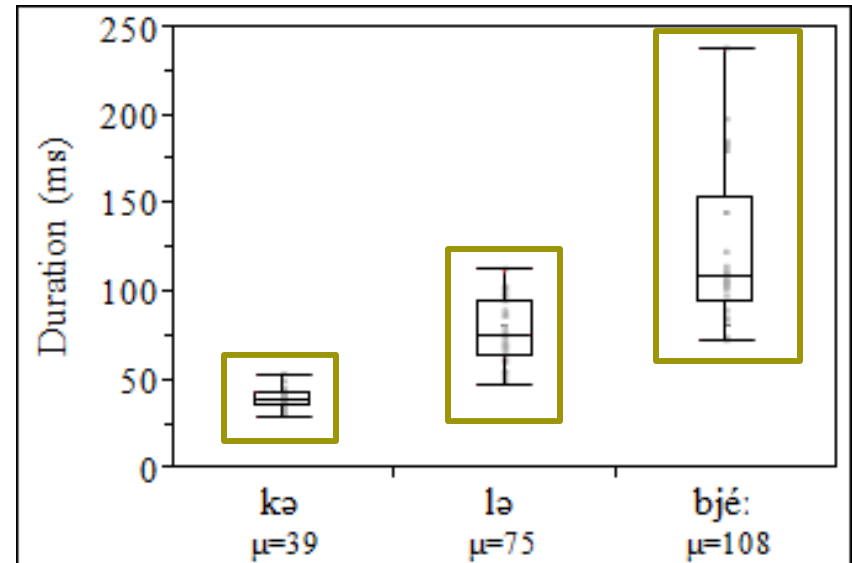
Speaker	kə	lə	bjé:
M2	37	80	89
M1	44	85	111
F1	48	101	195
M3	37	63	97
F2	34	61	129

# Duration Results

- ☞ [thə].[mə.jé:]
- ☞ Antepenult is significantly shorter than penult. Penult and final are not statistically different.



- ☞ [kə].[lə].[bjé:]
- ☞ Antepenult is significantly shorter than penult. Penult is significantly shorter than final.



# Conclusions

- ∞ The relationship between phonology and phonetics in general remains a very open question.
- ∞ In Burmese, the phonology and the phonetics seem to conflict because
  - there is variation in the phonetic results
  - the phonology in and of itself is inconclusive

	Phonology		Phonetics
	Markedness	Lapse, etc.	Duration
Cv.Cv.(CVC)	✓		
Cv.(Cv.CVC)		(✓)	✓

# Conclusions

- ∞ If the disyllabic footing is correct, Burmese and Trique have the same phonological structure but with different markedness patterns.
- ∞ Burmese and Trique differ in their constraint rankings, whereby some faithfulness constraint on footed syllables which is ranked higher in Trique than it is in Burmese, in relation to some markedness constraint.

Trique	Burmese
IDENTFOOTEDSYL > *V	*V > IDENTFOOTEDSYL

# Conclusions

## ☞ Burmese:

- Phonetics seem to support Butler (2012)
- More data are needed

## ☞ Further questions:

- How do Trique minor syllables compare with one another phonetically?
- How does the phonetic relationship between minor syllables in Trique compare with the phonetic relationship between minor syllables in Burmese?

**Merci!**

**Thank you!**

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