Towards a Phonological Model of Uyghur Intonation

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Speech Prosody 9

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Introduction

Goals of this project

A preliminary model of Uyghur intonation.

- No such models exist
- Uyghur intonation is typologically interesting!

Uyghur background

- Southeastern Turkic language
- Spoken by ~10 million people around Northwestern China
- Synthetic, agglutinating language with SOV word order

Uyghur prosody

- Uyghur is a stress language [1]
  - Consistent with most analyses of Turkish [2]
- Only *duration* is correlated with stress!
  - Pitch & intensity are not
- Suggests that Uyghur intonation is not sensitive to stress
  - Attested in some other languages like Kuot [4]
  - ***Prediction***: Uyghur intonation is exclusively edge-marking

Part 1: An acoustic study of Uyghur stress and intonation

Participants

Four native speakers of Uyghur from Xinjiang, currently living in USA

Stimuli

Two carrier phrases:

- _____ *bek yaxshi söz* "_____ is a good word"
- *Mahinur* _____*deydu* "Mahinur will say _____"

Target words: 8 minimal or near-minimal stress pairs

Word 1	Gloss 1	Word 2	Gloss 2
DAka	*gauze*	da**LA**	*plain*
BAza	*base*	ba**HA**	*price*
DAcha	*villa*	da**DA**	*father*
DOra	*medicine*	do**QA**	*forehead*
CHAsa	*square*	cha**TAQ**	*problem*
Acha	*elder sister*	a**CHA**	*branching*
BAla	*child*	ba**LA**	*disaster*
Ara	*fork*	a**RA**	*between*

Procedure

- Consultants read sentences from randomized list in sound booth
- Sentences preceded by context question:
  - *Néme boldi?* "What happened?"
- Each word read once in each carrier phrase
- Measure vowel **duration, intensity, and pitch**
- Fit linear mixed effects models

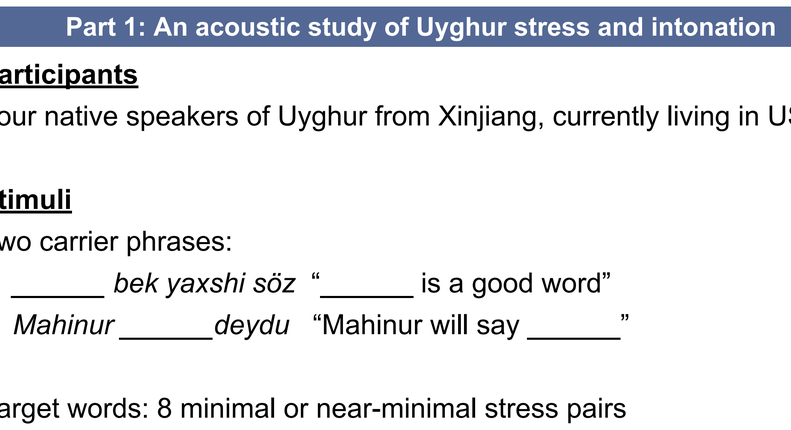


Fig 1: Word-initial stress in sentence-initial position

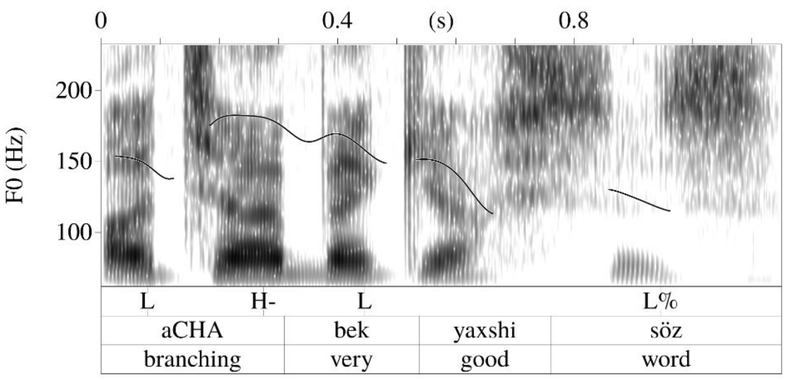
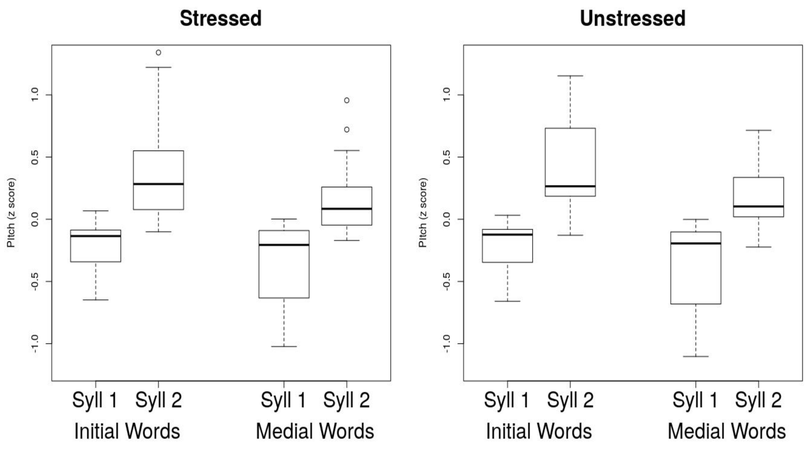


Fig 2: Word-medial stress in sentence-initial position

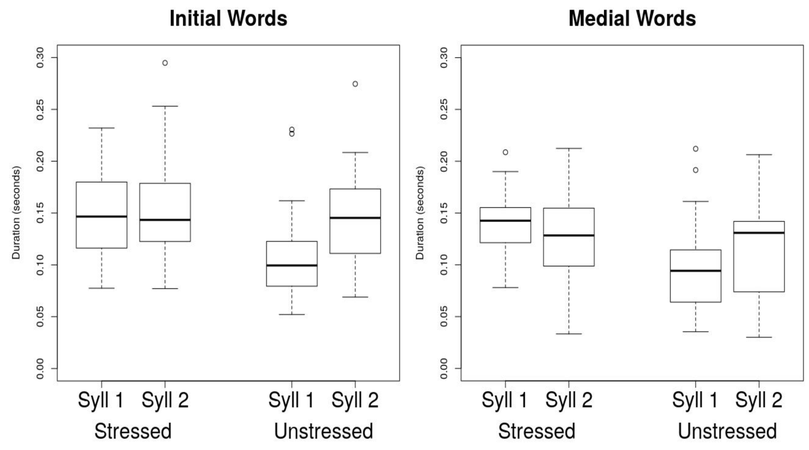
Part 1: Results

Pitch



- Sentence-initial words were ***higher pitched*** ($p < 0.05$)
- Second syllables in words were ***higher pitched*** ($p < 0.01$)

Duration



- ***Stressed syllables*** were ***longer*** ($p < 0.01$)
- Final syllable of initial words is ***longer*** ($p = 0.08$)

Part 1: Discussion

- Stress location is a significant predictor of ***duration*** but not ***pitch***
  - Stressed > unstressed
- Position of syllable in word and position of word in sentence predict ***pitch***
  - Final syllable > initial syllable
  - Sentence-initial > sentence-medial
- Duration results support analysis of Uyghur as a stress language
- Pitch results are consistent with edge-marking intonation

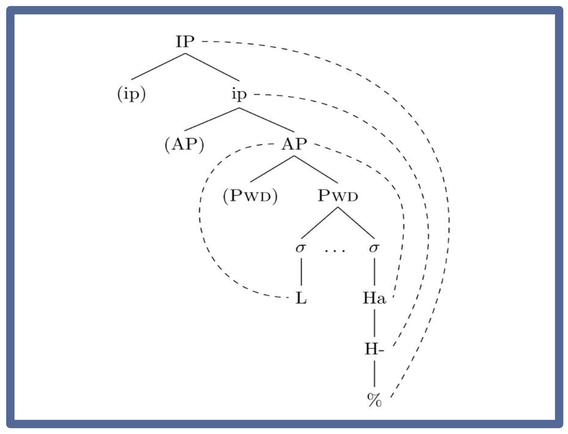


Fig 3: The proposed intonational structure of Uyghur

Part 2: The intonational phonology of Uyghur

We propose a *preliminary* AM model [3] of Uyghur intonation with three prosodic levels (Fig 3).

Sentences in Figs 4-6 are representative examples from an elicited corpus corpus varying number of syllables in subject and object, focus, questions, etc.

Intonational phrase (IP)

- Consists of one or more ips
- High (H%) or low (L%) right boundary tones
- Questions, continuation rises

Intermediate phrase (ip)

- Consists of one or more APs
- High tone (H-) on right edge
- Subjects, focused constituents
- Exhibits phrase-final lengthening (cf. Part 1)

Accentual Phrase (AP)

- Low tone (L) on left edge
- High tone (Ha) on right edge
  - Lower than Ha
- Consists of one or more prosodic words
- Exhibits phrase-final lengthening (cf. Part 1)
  - To a lesser degree than ip
- Hiatus resolution by vowel deletion
  - Across AP boundaries, but not ip boundaries

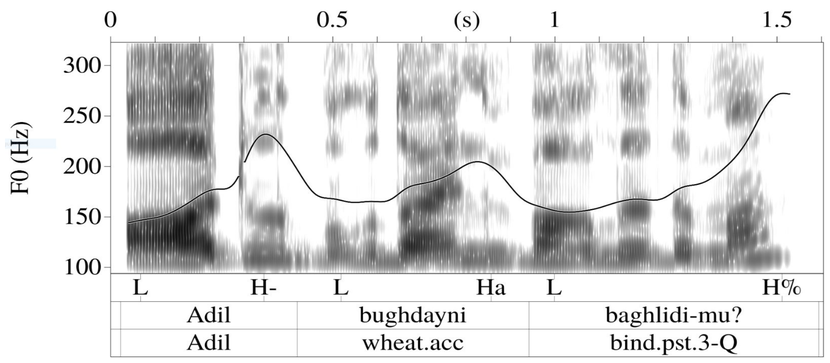


Fig 4: An example of question intonation

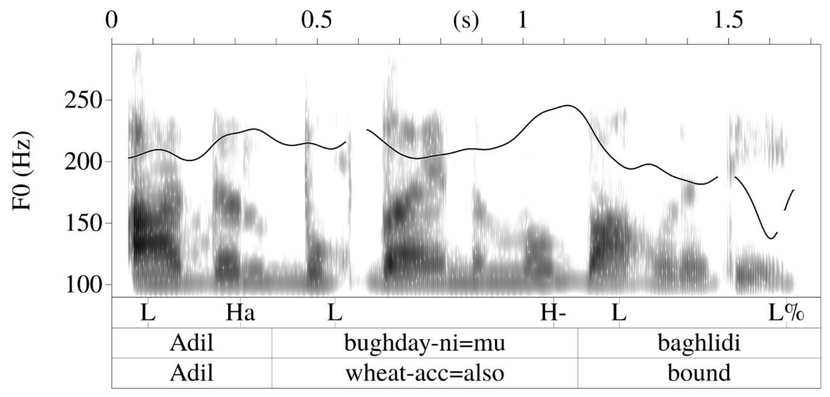


Fig 5: A focus particle causes the object to end the ip

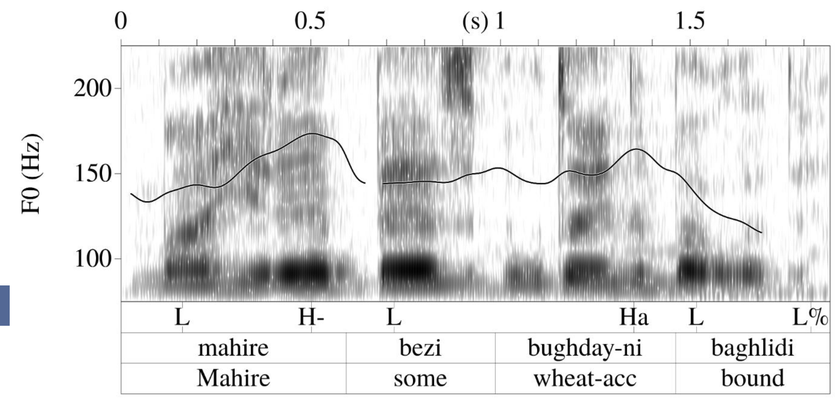


Fig 6: A multi-word AP in object position

Part 2: Discussion

- Uyghur is a stress language with only edge-marking intonation
  - Not unattested [4], but no formal model of such an intonation system exists
- Duration is the most reliable indicator of prominence
- Our proposed phonological model is sensitive to three prosodic levels
- Future work:
  - Expand the inventory of tone patterns
  - Expand the empirical scope
  - Integrate with syntactic analyses

Selected References

[1] Yakup, M. (2013). "Acoustic correlates of lexical stress in native speakers of Uyghur and L2 Learners." Ph. D. dissertation, University of Kansas.

[2] Ipek, C. (2015). "The phonology and phonetics of Turkish intonation." Ph. D. dissertation, University of Southern California.

[3] Pierrehumbert, J. (1980). "The phonology and phonetics of English intonation." Ph. D. dissertation, MIT.

[4] Lindstrom, E. & Remijsen, B. (2005). "Aspects of the prosody of Kuot, a language where intonation ignores stress," *Linguistics*, vol. 43(4), pp. 839–870.

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