

# Tone and Intonation in Asian Languages

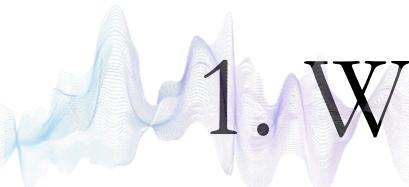
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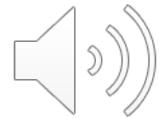
10 Dec 2025  
Palacký University Olomouc

1. What is intonation
2. What is tone
3. Tone and intonation
4. Tone language acquisition from non-tonal backgrounds



# 1. What is intonation and why does it matter?

Warm-up: spot the difference



Vs.



Vs.



Vs.



Vs.

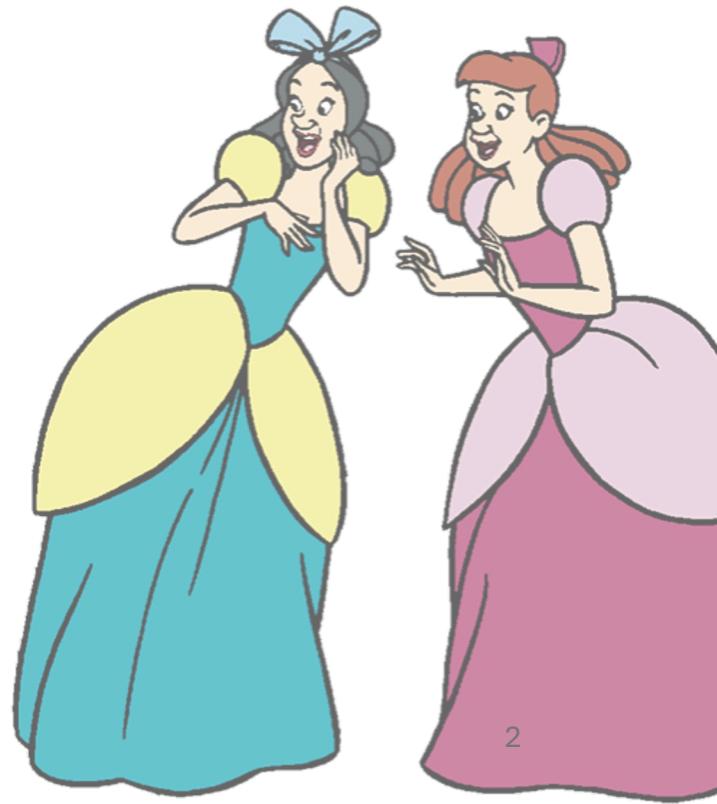


More examples?

# The Cinderella of language (teaching)

“It will be obvious that pronunciation has been the Cinderella of language teaching, largely because the linguistic sciences on which its teaching rests did not achieve the sophistication of semantics, lexicology, and grammar”

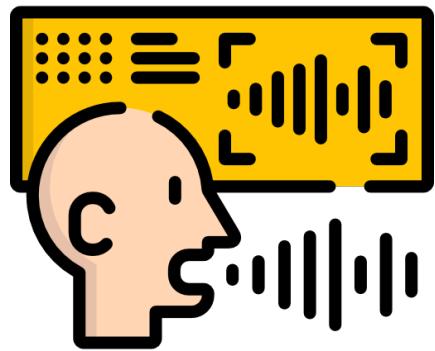
Kelly (1969, p.87)



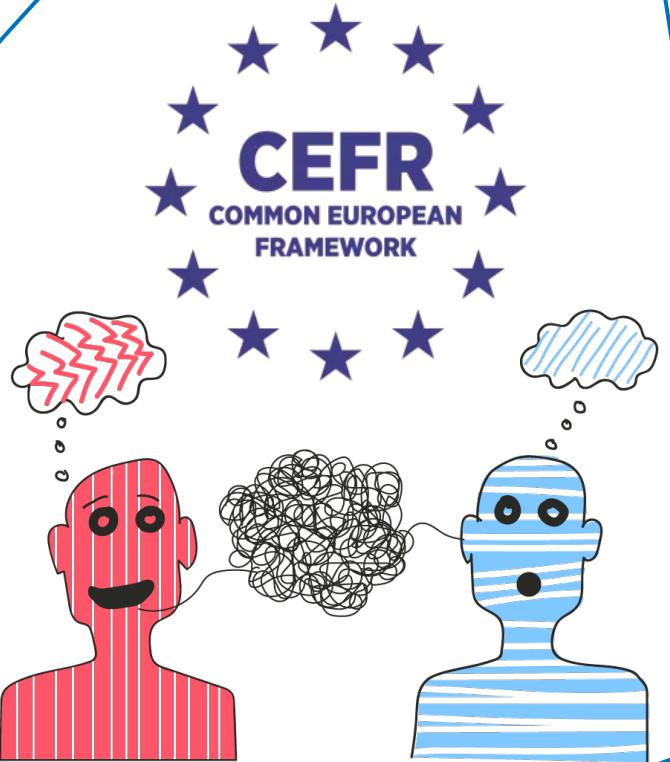
# Cinderella enters the palace (Levis, 2019; Busà, 2021)



Science



Education

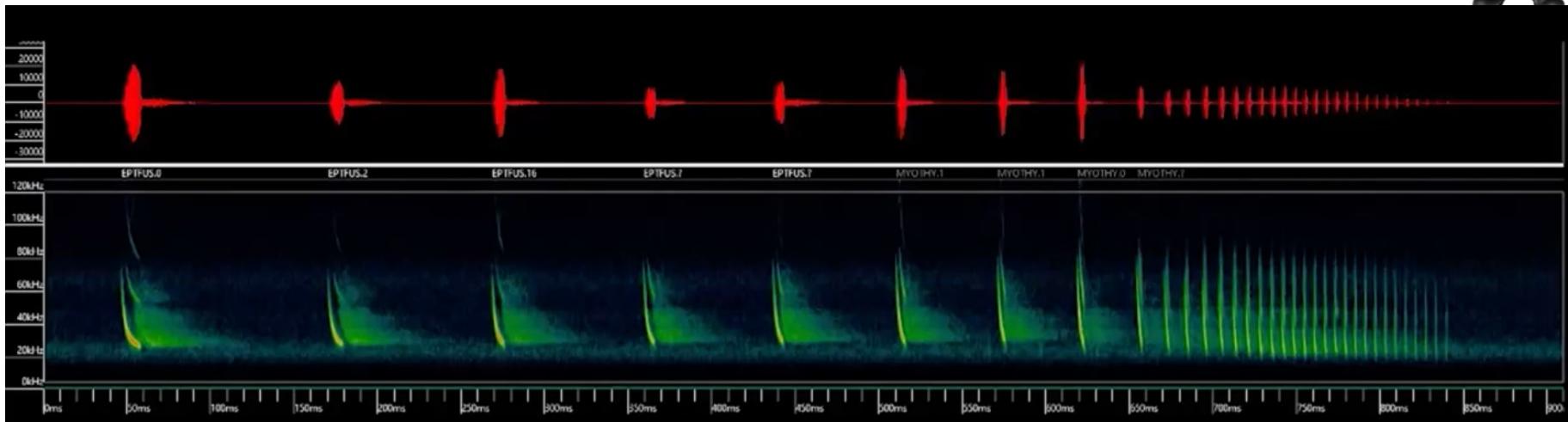


Technology



# Intonation universality: only a human language feature?

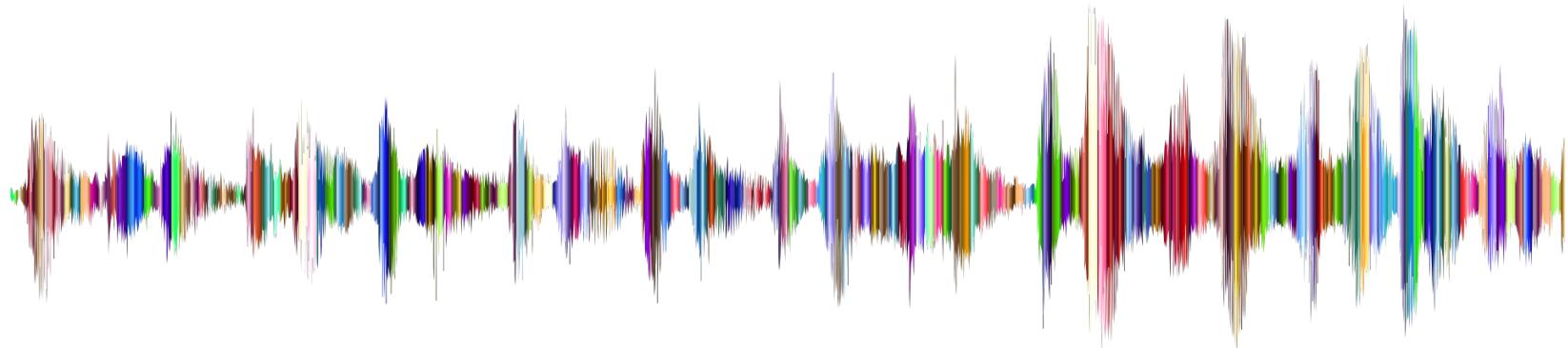
- Ohala (1983) suggested the existence of a universal pitch code – shared across mammals – linking high pitch to small size and submissiveness, and low pitch to large size and dominance
- Prosody in animals' communication (Filippi, 2016)



Credits to Denver Museum of Nature & Science

# Language Typology: intonation

- Every natural language uses intonation, and in most of them it is essential for signaling sentence types and conveying pragmatic functions (Pike, 1945; Ladd, 2008; Inbar et al., 2025): remember our warm-up test?



- Typology (Linguistics) in a nutshell: finding shared patterns within diversity.

**Can we find shared patterns in different languages' intonation?**

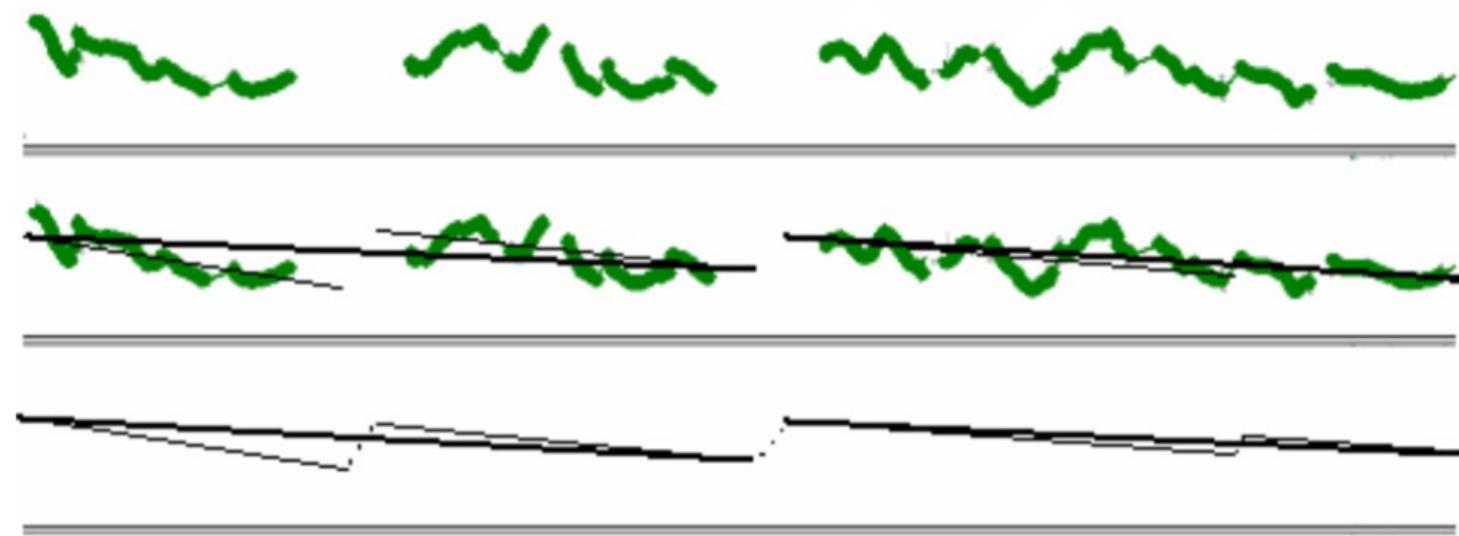
# Language Typology: universalist approach

- Intonation can be viewed as a pre-linguistic communicative system, shaped in part by the physical properties of speech production.
- Its core features appear to be shared across languages, while differences between languages largely reflect culturally conventionalized variations on these universal patterns.

See Bolinger (e.g. 1989), Lieberman (1967), and Fujisaki (e.g. 1983), among others.

# Intonation universals: declination

- Pitch typically falls from the start of an intonational phrase to its end ([Pike 1945](#)).
- Phonetically predictable variation is due to articulation or perception, and can be considered ‘universal’ ([Ohala et al., 2004](#)).



[Cao \(2004\)](#)

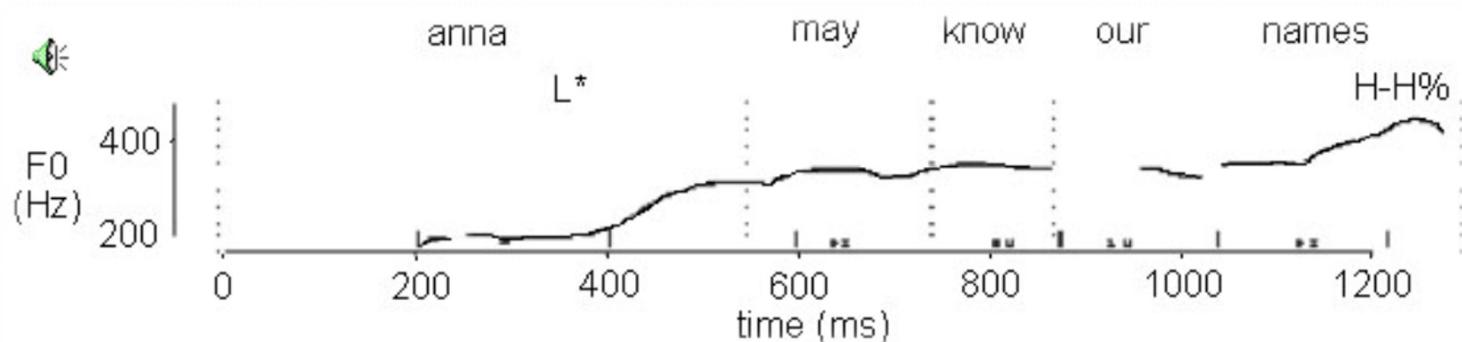
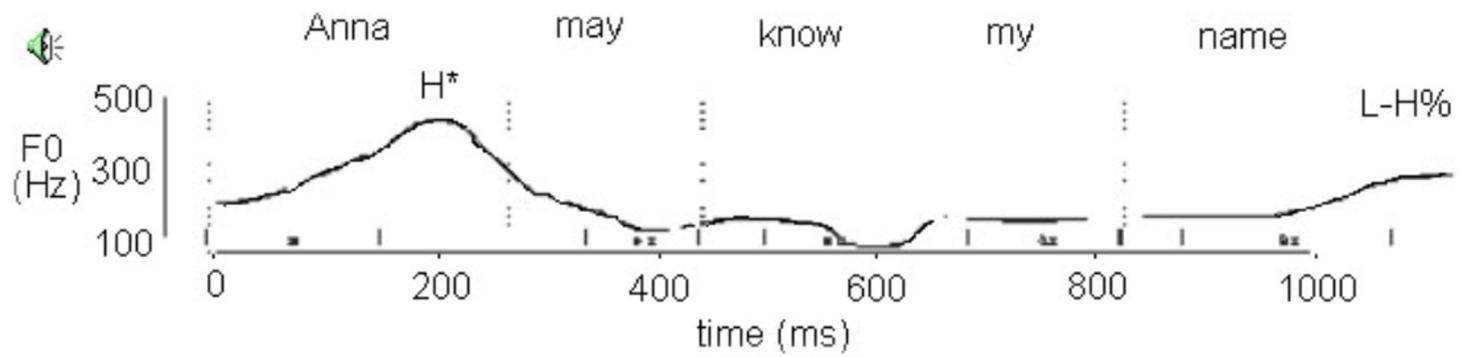
# Language Typology: phonological approach

- Intonation is an integral part of phonology, making typological generalizations about intonational systems both meaningful and feasible.
- Pitch contours are analyzed as sequences of discrete, local phonological events rather than as holistic global shapes or slopes.
- Pitch accent and Boundary tones.

See [Bruce \(1977\)](#), [Pierrehumbert \(1980\)](#), and [Beckman \(1986\)](#), among others.

# Pitch accent (\*) and boundary tone (%)

TONification activity: Pair each audio file with its annotation



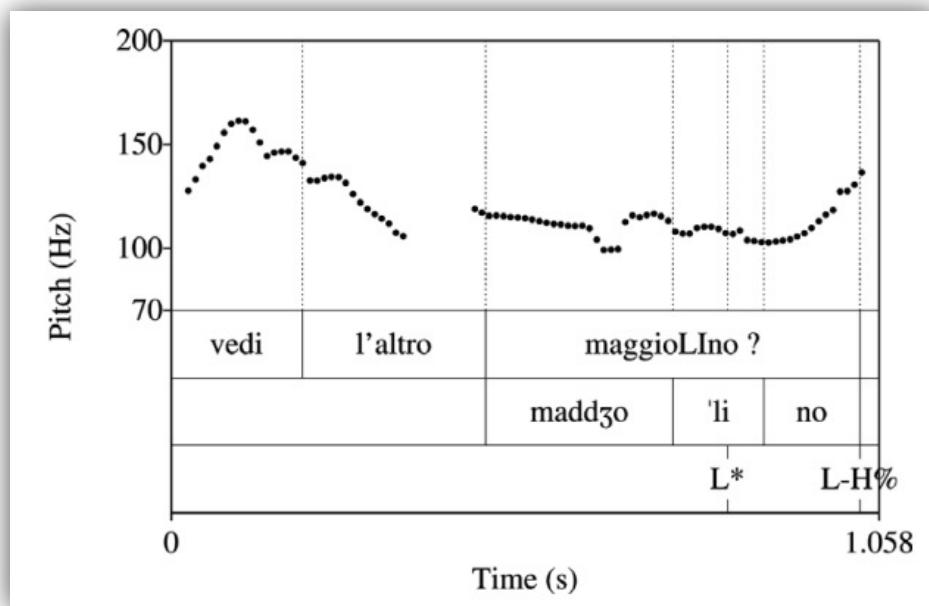
L(ow)

H(igh)

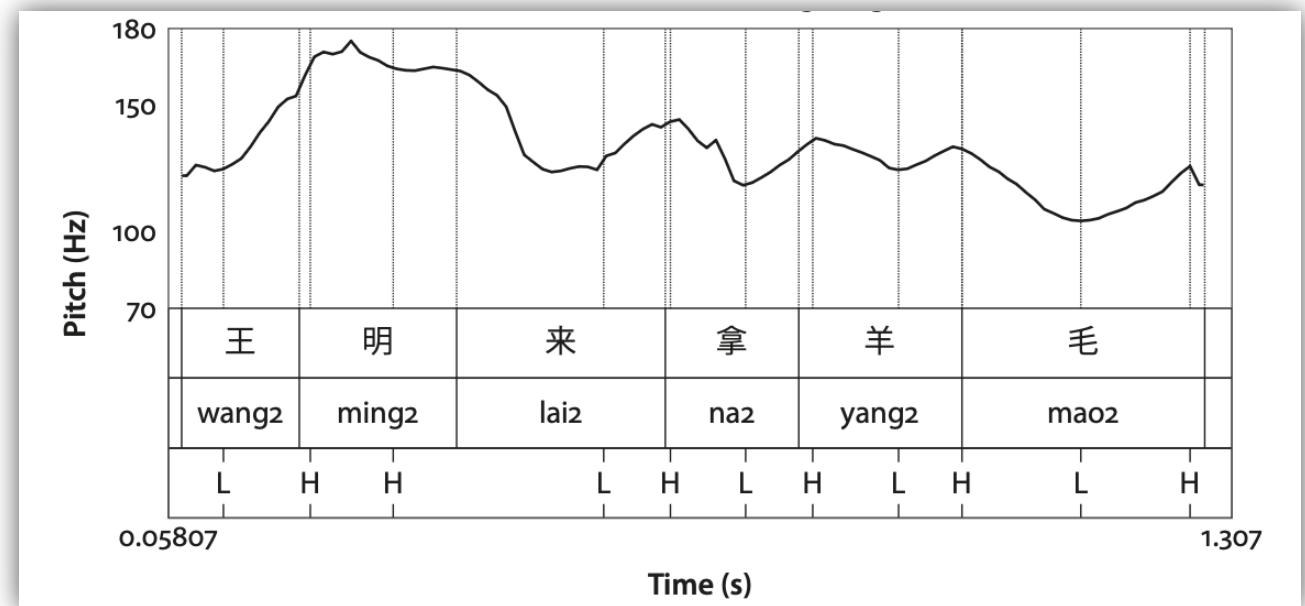
Credits to Macquarie University website, Department of Linguistics

# Boundary tone VS Lexical tone

- Boundary tones are “intonational” cues that associate with the edges of prosodic constituents
- Lexical tones are...



Savino (2012)



Yang (2016)



## 2. What is Tone?

- Tone can change the meaning of a word and is part of the syllable phonological unit.

Sky      vs.      Spy



Mí 迷 vs. Mì 秘



# Tone typology

- More than 60% of the world's languages are tonal (Yip, 2012).
- Types of tones: lexical, grammatical, or a combination of both.

mark of case in Maasai (Nilo-Saharan; Kenya, Tanzania)

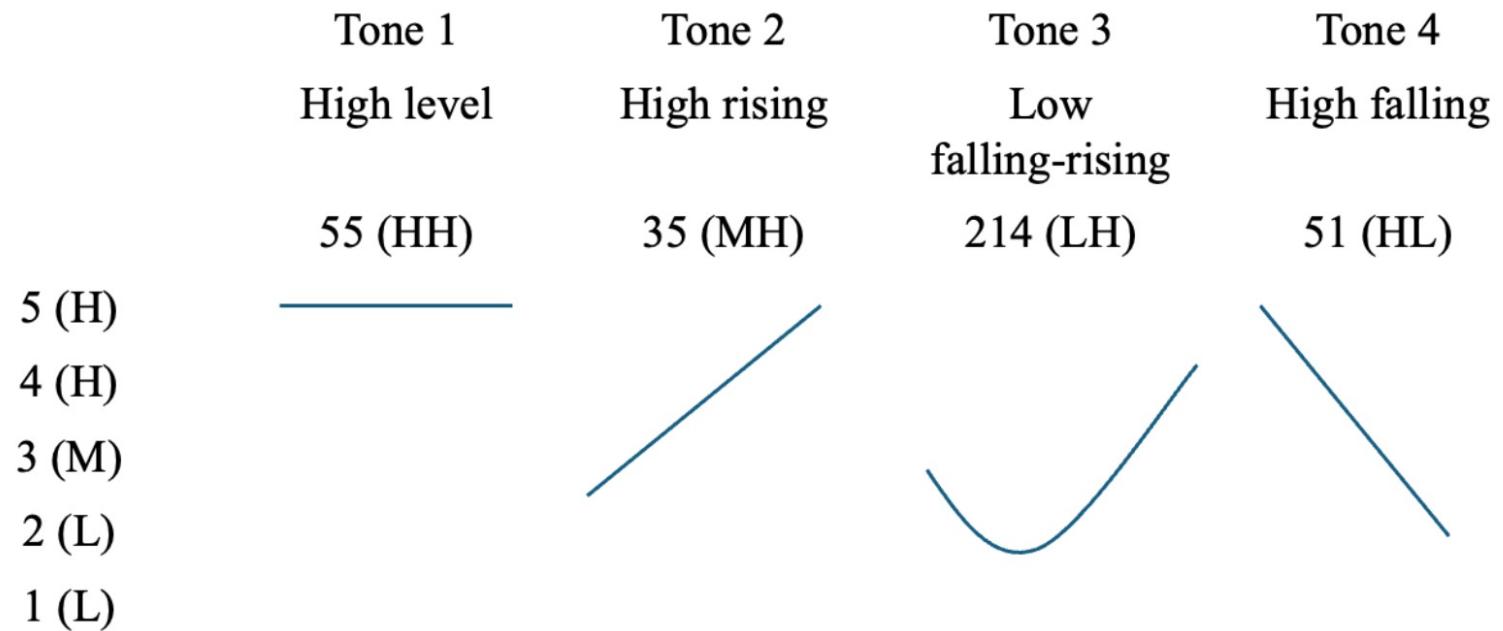
Parallelism between lexical tones on nouns and grammatical tones on verbs. Examples from Iau (Lakes Plain; Indonesia, Papua)

	<i>nominative</i>	<i>accusative</i>	
class I:	èlòkùnyá	èlúkónyá	'head'
	èncùmàtá	èncúmátá	'horse'
class II:	èndérònì	èndérónì	'rat'
	ènkòlòpà	ènkòlópà	'centipede'
class III:	òlmérégèsh	òlmérègèsh	'ram'
	òlósówùàn	òlósòwùàn	'buffalo'
class IV:	òmótònyí	òmótònyí	'bird'
	òsínkìrrí	òsínkìrrí	'fish'

	<i>Tone</i>	<i>Nouns</i>	<i>Verbs</i>
	H	bé	'father-in-law'
	M	bē	'fire'
	SH	bé'	'snake'
	LM	bě	'path'
	HL	bē	'thorn'
	HM	bē	'flower'
	ML	bě	'small eel'
	HLM	bē-	'tree fern'
			bá
			'came'
			bā
			'has come'
			bá'
			'might come'
			bă
			'came to get'
			bâ
			'came to end point'
			bā
			'still not at endpoint'
			bā
			'come (process)'
			bâ-
			'sticking, attached to'

# Tone annotation

- Tonal categories are classified by two sets of descriptive terms:
  - 1) **register** (high/low)
  - 2) **contour** (rising, falling, dipping, etc.)
- Chao (1930)'s tone letter system



*Citation forms of the four lexical tones in Mandarin according to Chao (1930)'s tone letters*

# Acoustic correlates of tone

- Fundamental frequency (F0) is the primary acoustic correlate of tone and represents the vibration rate of the vocal folds; specifically, it consists of the number of open-close cycles within the vocal folds occurring in one second.
- F0's measure unit is Hertz, which correspond to one cycle per second.
- In terms of articulation, the primary factor determining voice pitch is the tension of the vocal folds ([Ladefoged, Johnson, 2010, p. 254](#)).



# But...

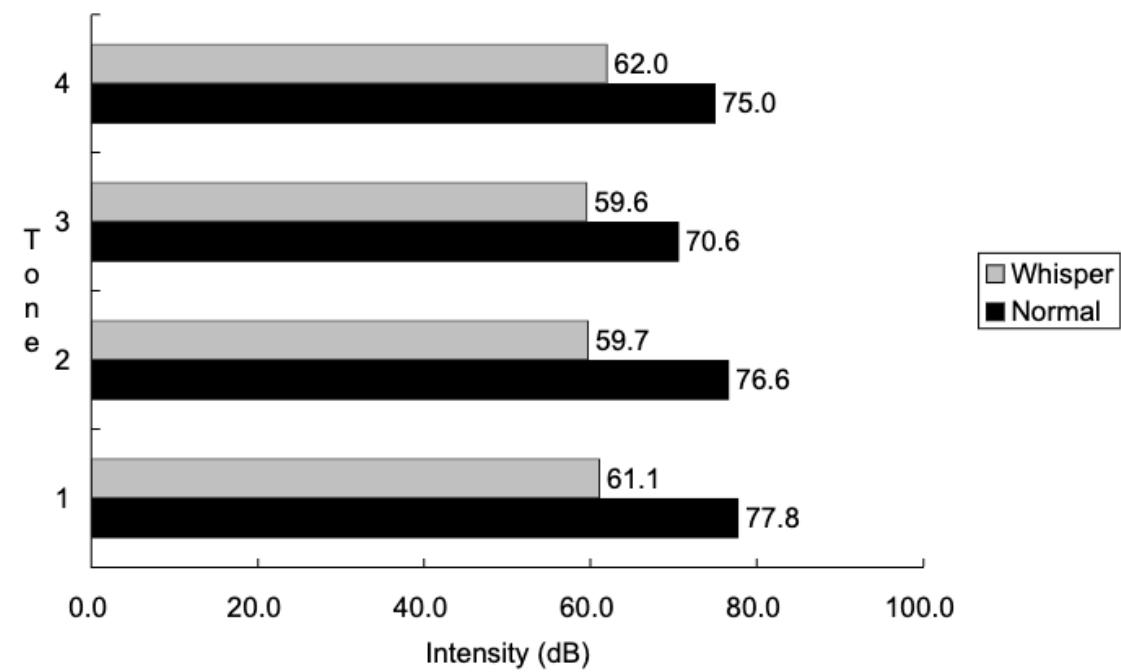
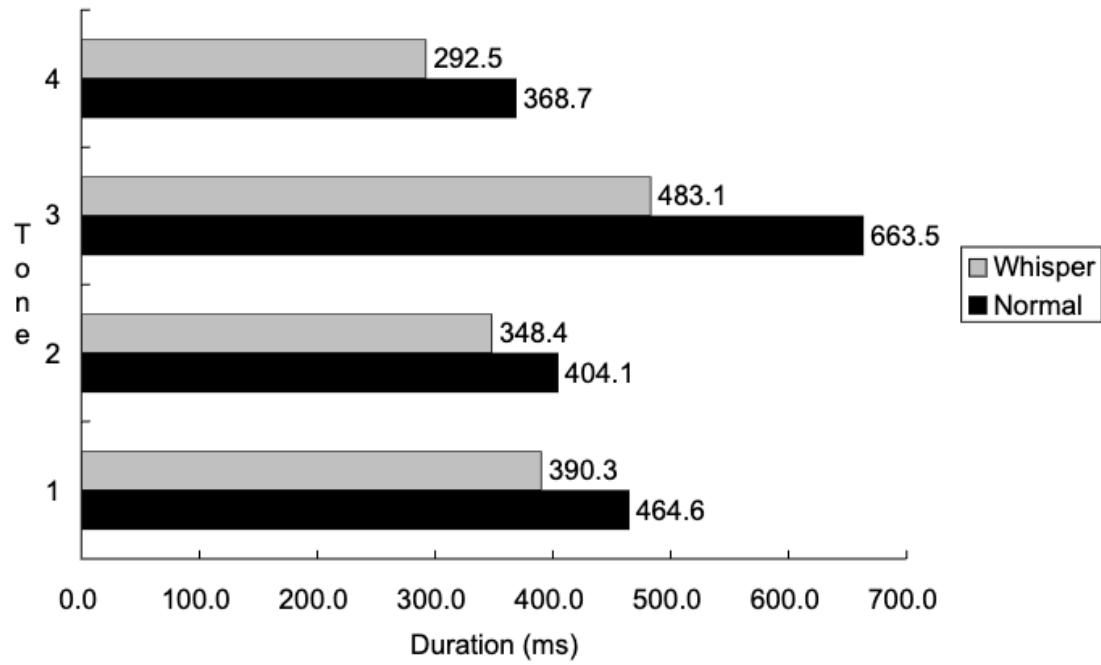
- Now imagine we're secretly meeting our Chinese sweetheart at home. Our parents are in the next room, so we can't speak out loud. We'd probably end up whispering, but what happens to F0 when we whisper?
- How can our partner tell ài 爱 ‘love’ from āi 哀 ‘mourn’?

**How speakers differentiate tones when pitch is “unavailable”?**



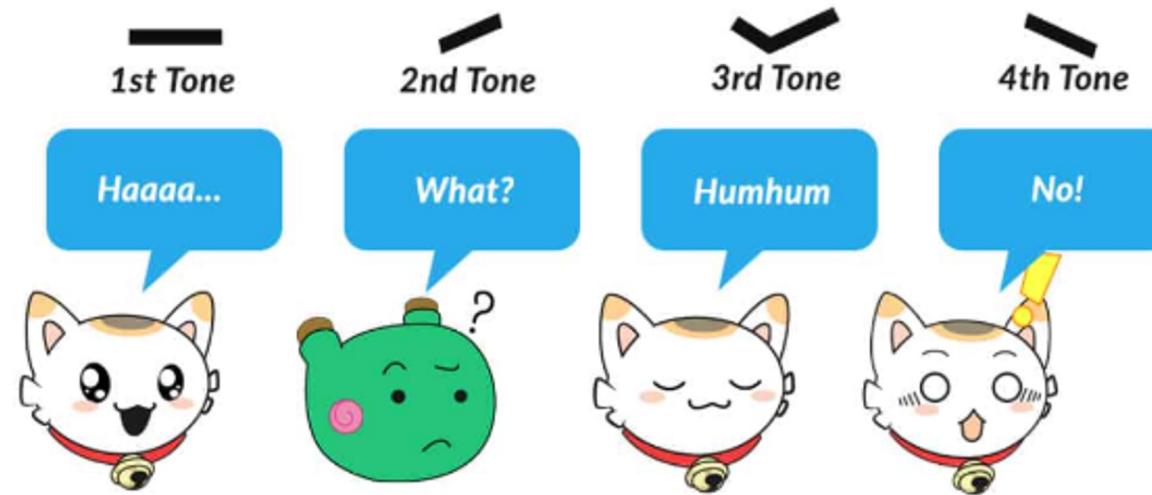
# Secondary acoustic correlates of tone

- Research shows that Mandarin tones have intrinsic duration and intensity, which is generally preserved both in phonated and whispered voice.



Chang & Yao (2007)

### 3. Tone and intonation

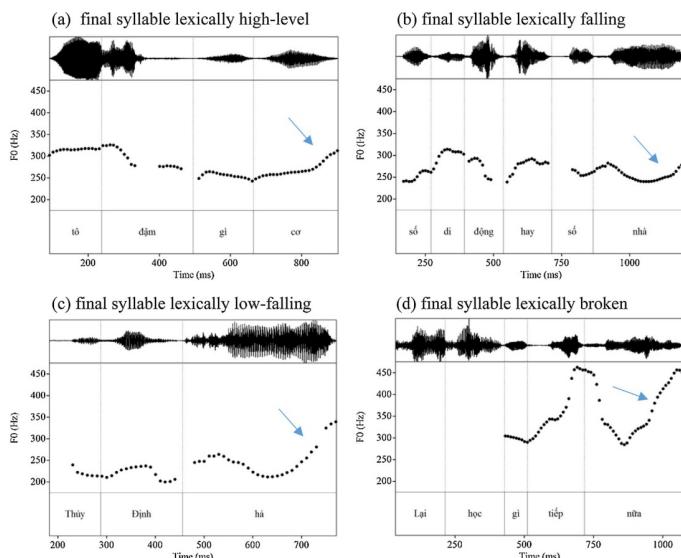


Credits to Ninchanese Blog

- Both tone and intonation involve melodic patterns shaped by pitch.
- **Key difference:** tone is *lexically specified* and therefore not normally treated as an intonational feature.
- **Tone and intonation can interact**, influencing each other in various ways.

# Following the phonological approach...

- In some tone languages – such as Chinese Chengdu dialect ([Chang 1958](#)), Thai ([Abramson 1962](#)), Vietnamese ([Ha & Grice 2017](#)), Cantonese ([Xu & Mok 2011](#)) – sentence-level intonational meanings can arise from modifications or even neutralization of the final **lexical tone** in a phrase, caused by the influence of an additional **boundary tone** associated with the utterance-final syllable.
- However, this doesn't seem to happen in Mandarin Chinese, in which the global raising of F0 is more important than the boundary effect ([Chen 2022](#)).



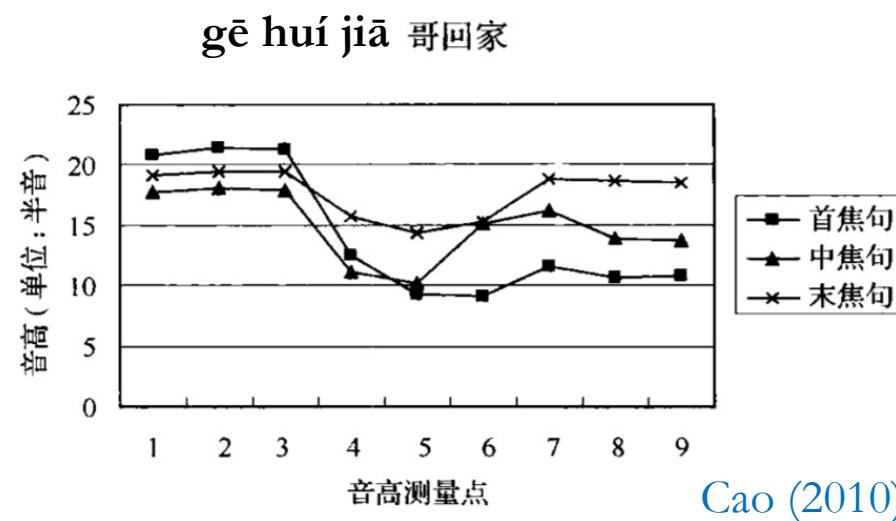
## Vietnamese data from [Ha & Grice \(2017\)](#)

Final syllables differ in lexical tone and word class:

- high-level, particle;
- falling, noun;
- low-falling, question word;
- broken tone, particle.

# Tone and focus

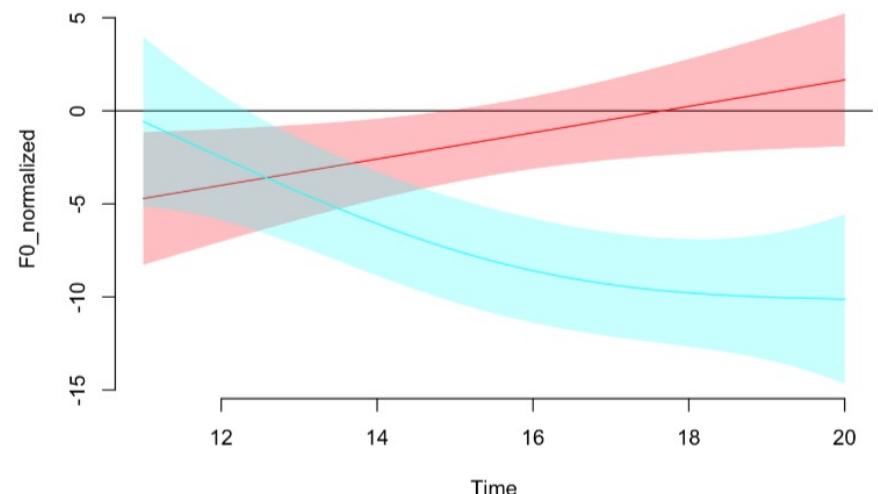
- Even in languages without clear stress systems, or where pitch is lexically specified (e.g., tone languages and pitch-accent languages), speakers still use intonational cues to highlight local prominence or emphasis.
- For instance, both Chinese ([Gårding 1987](#)) and Japanese ([Pierrehumbert & Beckman 1988](#)) allow speakers to signal emphasis by locally widening the overall pitch range, despite having lexically fixed pitch patterns.



# Intonation in tone languages

- Tone languages also exhibit intonation patterns:  
“Small ripples riding on large waves” ([Chao 1968](#))
- Debunking the “SFP myth”: while Chinese SFPs encode pragmatic meaning, they do not replace intonation. SFPs and intonation work together, not in isolation.

**Ma1 嘴** vs. **Ma2 嘛** in Mandarin ([Casentini, Francolino, 2025](#))



# Tone and (musical) intonation

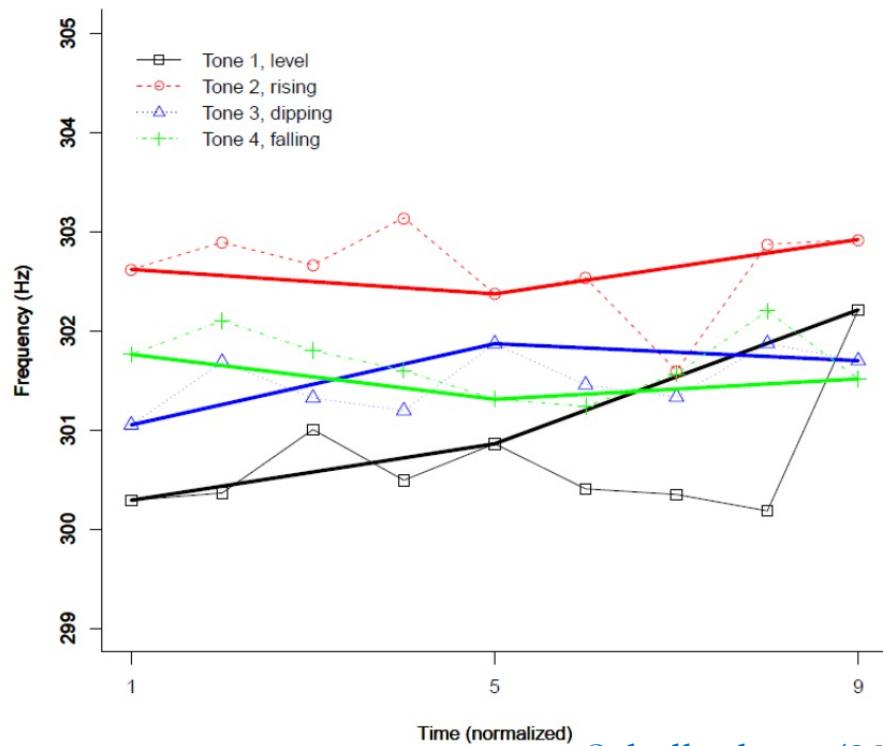
- Remember secondary acoustic correlates of tone?
- Now let's imagine we're so deeply in love with our partner that we decide to sing them a song in Mandarin...



**Are tones preserved in Mandarin songs?**

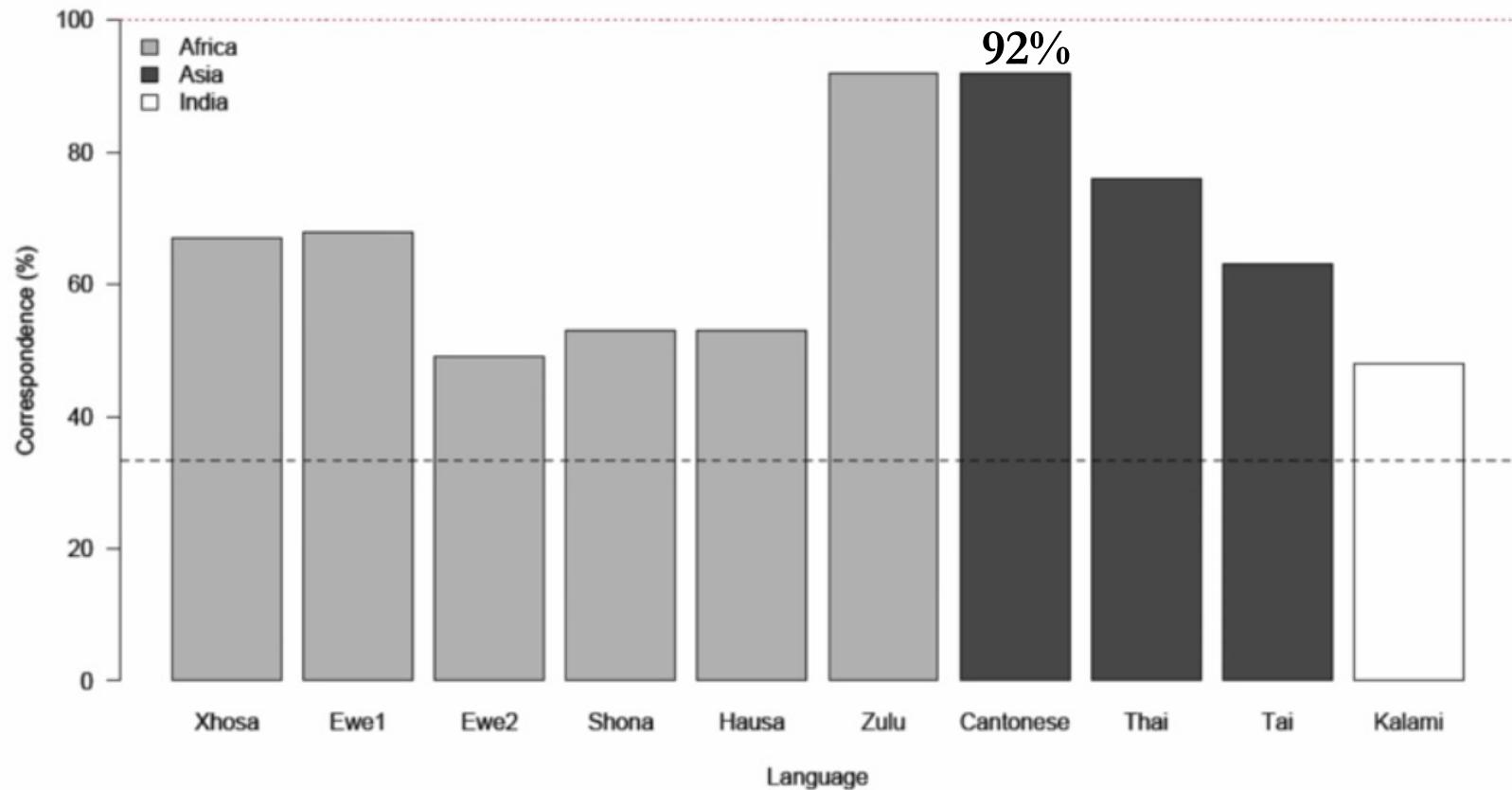
# Are tones preserved in Mandarin songs?

- Less than 40% of melodic note sequences had the same direction as those of the lexical tones on the corresponding syllables (Vondenhoff, 2009)
- Different tone on the same melody:



Schellenberg (2013)

# Correspondence between speech and sung melody



Wong & Diehl (2002)

# Cantonese vs. Mandarin: a plausible explanation

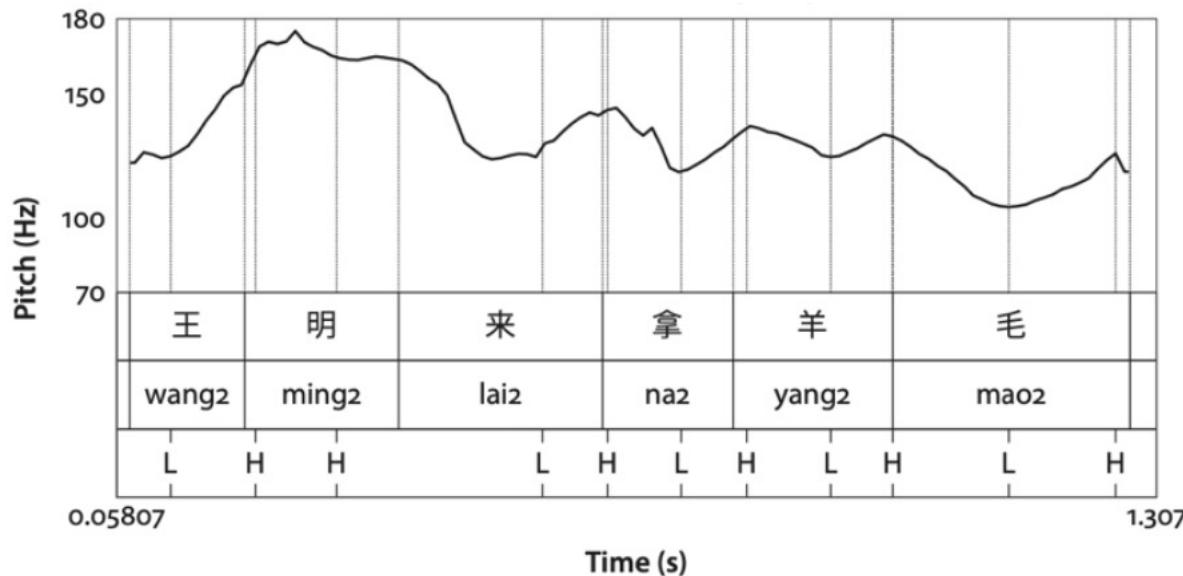
Tone	Description	Value	Example			Corpus	Song
1	High level	55	/si1/	詩	'poem'	21%	22%
2	High rising	35	/si2/	史	'history'	17%	10%
3	Mid level	33	/si3/	嗜	'fond of'	19%	17%
4	Mid-low falling	21	/si4/	時	'time'	11%	15%
5	Mid-low rising	23	/si5/	市	'market, city'	11%	13%
6	Mid-low level	22	/si6/	視	'to view'	21%	23%

Tone	Description	Value	Example			Corpus	Song
1	High level	55	/fū/	孵	'to hatch'	25%	16%
2	High rising	35	/fú/	福	'good fortune'	24%	28%
3	Low	21(4)	/fǔ/	腐	'to ferment'	16%	20%
4	High fall	53(51)	/fù/	父	'father'	35%	37%

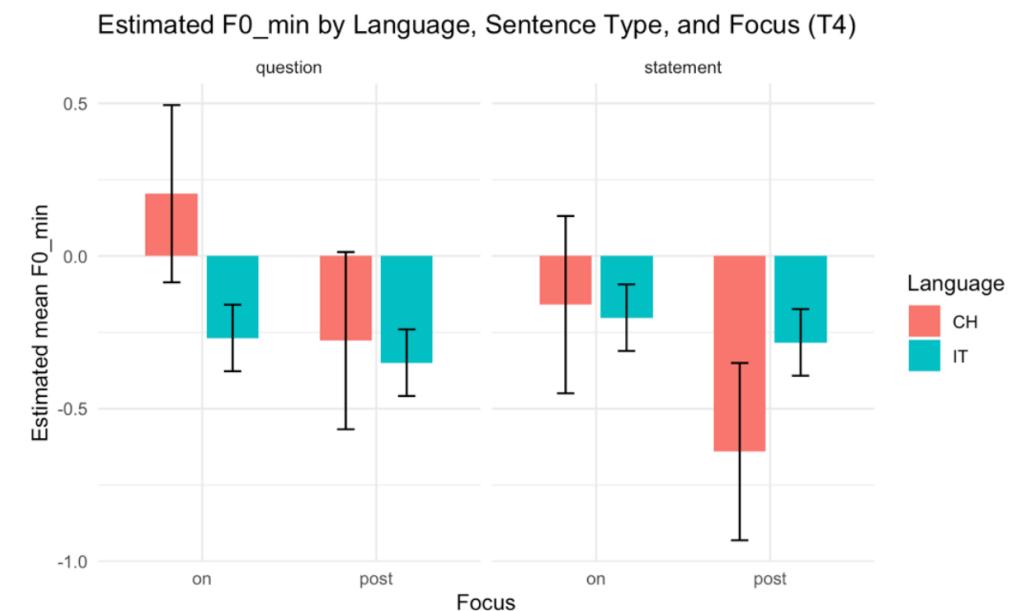
Kirby (2023)

# 4. Tone language acquisition from non-tonal backgrounds

Tone processes in connected speech: tone target undershoot and post-focus compression

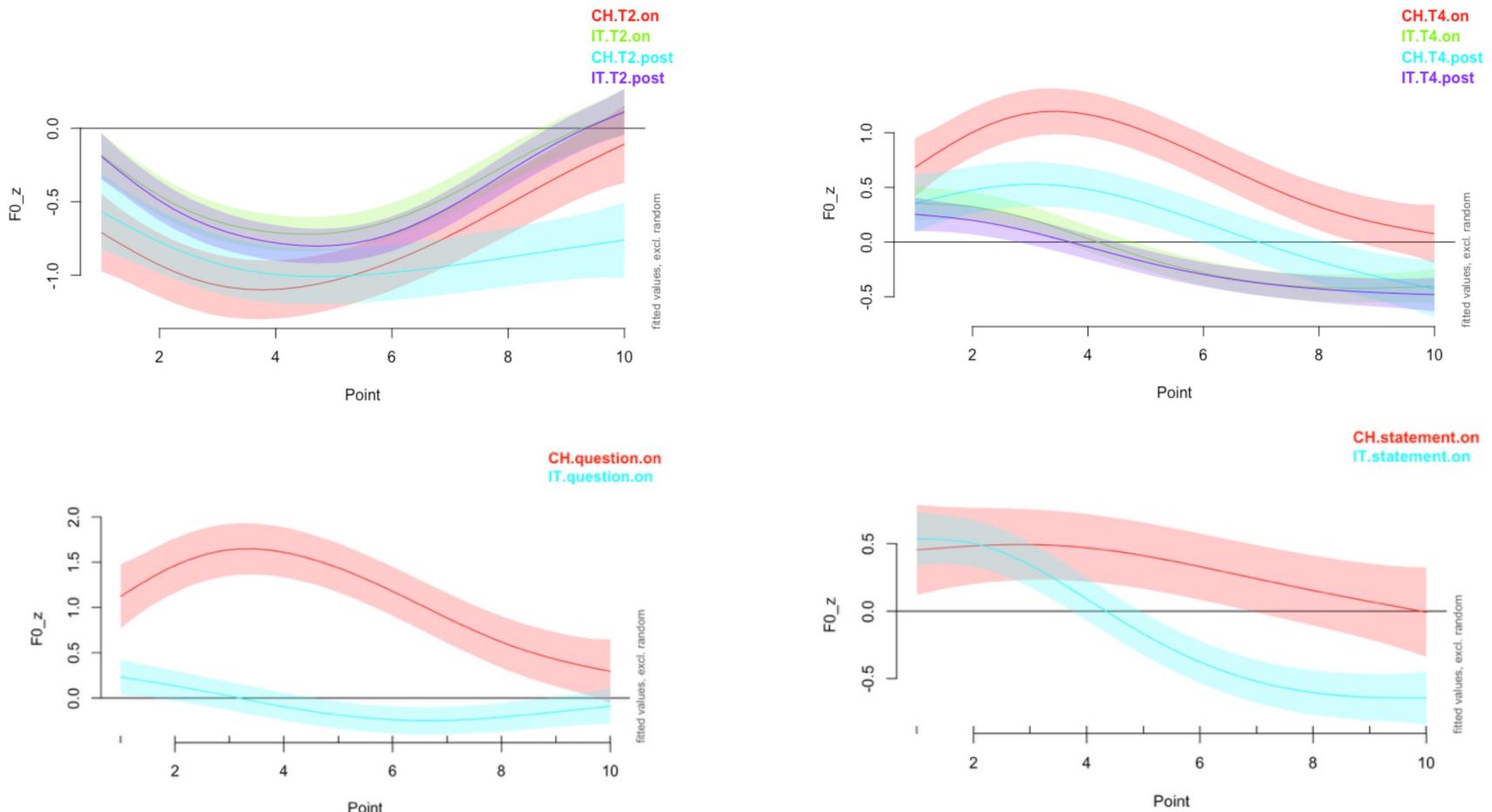


Yang (2016)



Francolino (in preparation)

# Citation tones vs. connected speech: navigating small ripples on large waves



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