Diachrony, intonation and language contact in Greek

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The *Greek in contact* project https://greekincontact.phon.ox.ac.uk/

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Intonation and diachrony: how language contact shapes intonational patterns, supported grant ES/R006148/1 from the UK Economic and Social Research Council.

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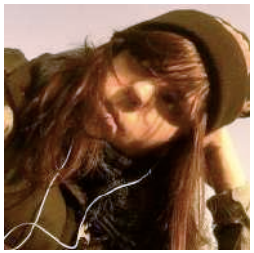
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Situating our research in the field

- How do intonation patterns vary in Greek regional varieties?
- What is the role of contact as one of the sources of variation?
- Research of variation in intonation addresses differences due to
  - Language internal factors, e.g., phonological, pragmatic, syntactic …
  - Language external factors, e.g., gender, age, social status, power, dialect …
    - Language contact

Aims

- Project: *Greek in contact*
- Tunes: declaratives, yes-no (polar) questions and continuation rises
- Geographic span:
  - Turkish →Asia Minor Greek and Cypriot Greek
  - Venetian → Cretan Greek and Corfiot Greek
  - Athenian Greek used as a baseline
- Time span: early 1900s, mid 1900s and the present

How this talk is organized

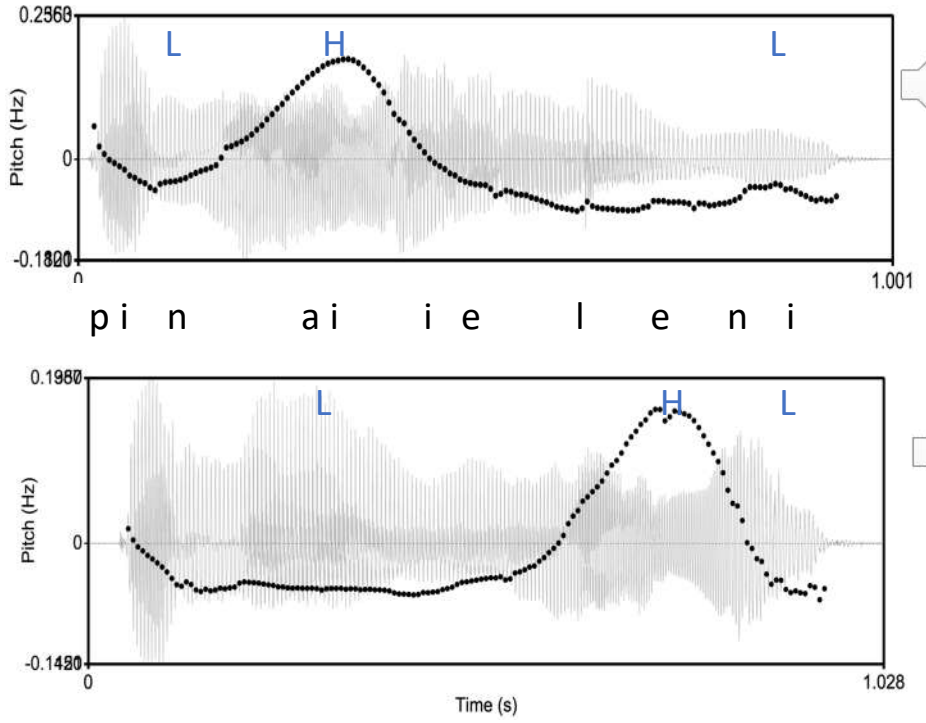
- Intonation basics revision
- Background
- Research questions
- Study 1: Athenian – Cretan – Venetian
- Study 2: Athenian – Asia Minor Greek – Turkish
- Discussion

INTONATION BASICS: REVISION

Intonation basic ideas 1

- Tune → illocutionary force of a sentence
- Tune = pitch accents and edge tones
- Synchronization is important

—alignment: e.g., L H L



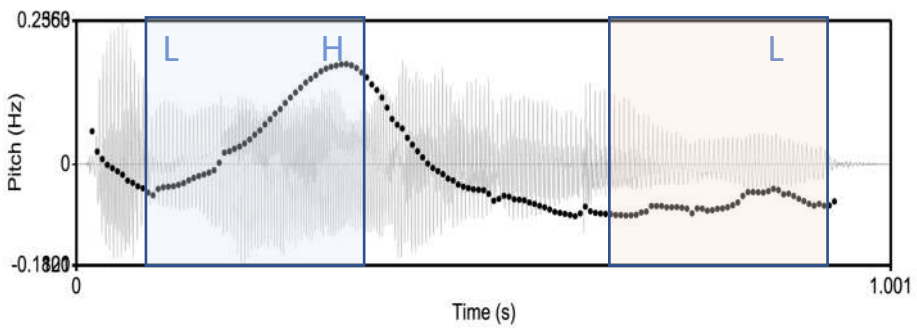
[piˈnai i eˈleni]

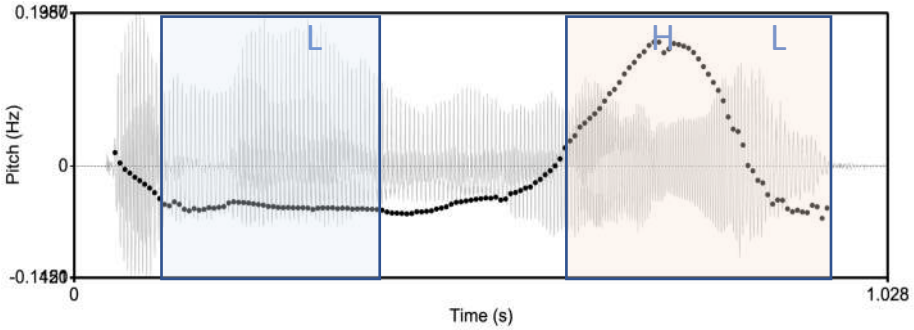
“Eleni is hungry.”

“Is Eleni hungry?”

Intonation basic ideas 2

- Only obligatory elements of a tune: pitch accent on the nucleus (NPA, or sentence stress) + edge tones
- Difference between the example statement and yes-no question: the type of NPA and the type of edge tones—a phonological difference





Intonational variation

- Within a language such differences may signal different illocutionary force, but across languages the same illocutionary force may be signaled by different alignment, as we will see
- Such phonological variation may also occur in regional varieties of the same language

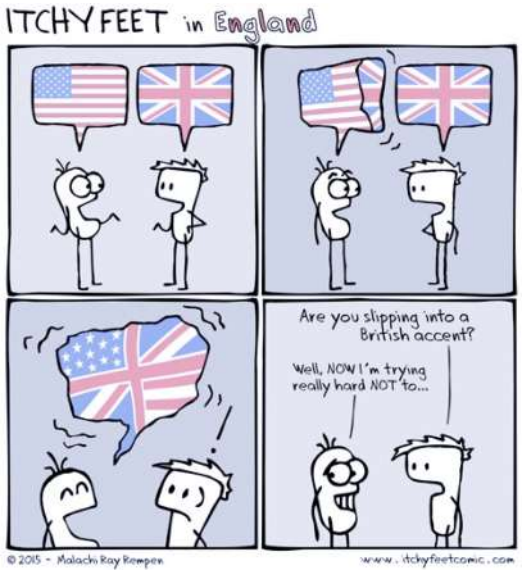
RESEARCH BACKGROUND

Intonational variation

- Intonational variation in Athenian Greek
  (e.g., Arvaniti, Baltazani & Gryllia 2014; Katsika & Arvaniti 2016; Gryllia, Baltazani & Arvaniti 2018, 2019; Lohfink, Katsika & Arvaniti 2019; Baltazani, Gryllia & Arvaniti 2019)
- Less work on intonational variation across Greek dialects
  (e.g., Papazachariou 1998, 2004; Papazachariou & Archakis 2001; Themistokleous 2012; Giakoumelou & Papazachariou 2013; Adamou & Arvaniti 2014; Baltazani & Kainada 2015, 2019; Baltazani, Przedlacka & Coleman 2019 a,b, 2020, 2022)
- Extensive work on intonation of Italian dialects (e.g., Avesani 1990; Caputo & D'Imperio 1995; Grice 1995; Ladd 1996:128; D' Imperio 2002; Gili Fivela et al., 2015), but very little is known about Venetian intonation (Payne 2005; Di Russo 2011)
- Not much is known about Turkish intonation (Levi 2002; Göksel & Kerslake 2005; Özge & Bozsahin 2010; Ipek & Jun 2014)

Intonation and language contact 1

- Contact-induced linguistic influences determined by economic, political and demographic factors (Sankoff, 2001)
- The effects of contact on lexicon, morphology and syntax are well documented (e.g., Thomason, 2001; Clyne, 2003)
- We can't assume that intonation behaves the same



Intonation and language contact 2

- Recent studies on prosodic variation in bilingual speakers

  (e.g., Mennen, 2004; Elordieta & Calleja, 2005; Simonet, 2010; O'Rourke, 2012; Queen, 2012; Romera & Elordieta, 2013; Gabriel & Kireva, 2014; Van Rijswijk & Muntendam, 2014; Lai & Gooden, 2018)

- Ongoing language contact results in intonational variation and change
- Novel patterns may combine elements from both contextual languages

  (e.g., Queen 2012 on bilingual Turkish-German speakers in Germany; O'Rourke 2012 on Quechua-Spanish bilinguals; Elordieta & colleagues 2003, 2005, 2016 on Basque-Spanish bilinguals)

Diachrony

- Are contact effects preserved when contact ends?
- Prosodic aspects of cross-linguistic contact are under-researched, especially past contact that has subsequently ceased
- Some evidence is emerging that prosodic characteristics may persist in a recipient language for decades or even centuries after the cessation of contact

(Colantoni & Gurlekian 2004 on Italian-Spanish contact in 1850s in Buenos Aires; Bullock 2009, French-English contact ended in 1830s in Pennsylvania; Van Buren 2017, Spanish-English contact in New Mexico)

RESEARCH QUESTIONS

Research questions

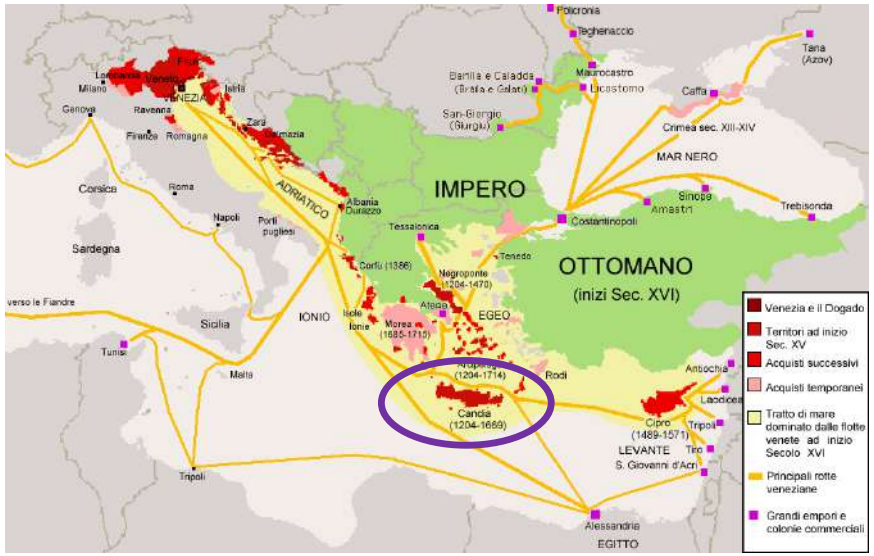
Two major questions common to both studies (minor questions relevant to individual cases to be discussed later):

- Is there evidence of influence of these neighbouring languages, Italian and Turkish, on the intonation of the Greek varieties?
- Can a statement be made as to how long after the end of contact this influence lasts?

ATHENIAN – CRETAN – VENETIAN STUDY

History: Contact with Venetian 1

Venetian occupation (1204-1699) of Crete for 4 ½ centuries



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History: Contact with Venetian 2

- Trade (Stallsmith 2007:153) and administration (Maltezou 1991)
- Greek documents in Latin script (Manolessou 2018:156)
- "… intermarriage between Cretan archontic families and Venetian nobles, […] irregular unions between Venetians and lower-status Cretans [...] Venetian colonial nobles joined Cretans in the 1363 revolt of St. Titus [...]" (Stallsmith 2007:156)
- Written modern Cretan solidified in late 16th century (Horrocks 2010:360-361)
- Phonological and morphological changes coincided with social changes (Horrocks 2010)

History: Contact with Venetian 3

- Ottoman era 1669 – 1898: decentralized administration without colonists to Crete (Hooper 2003:27; Greene 2000:87; Stallsmith 2007:161)
- Maintenance of contacts with Venice through trade (Greene 2000:128) and imports of textiles and glass from Venice (Greene 2000:126-127)
- In the *Linguistic Atlas of Crete* (Kontosopoulos 1988) there are far more lexical items borrowed from Venetian than from Turkish
- Crete didn't join the Hellenic Republic until 1912

Background on Venetian

- A continuum exists between modern regional Italian in Veneto and the basilect dialect of Venetian due to a situation of continuous language contact (Cerruti, Crocco & Marzo, 2017)
- Utterances in our corpus: Venetian Italian → Italianized Venetian (Grassi 1993) → Venetian Dialect
- This classification was based on lexical, morphological and segmental criteria (Canepari 1976; Ferguson 2007)
- No significant differences in declarative and polar question intonation among varieties

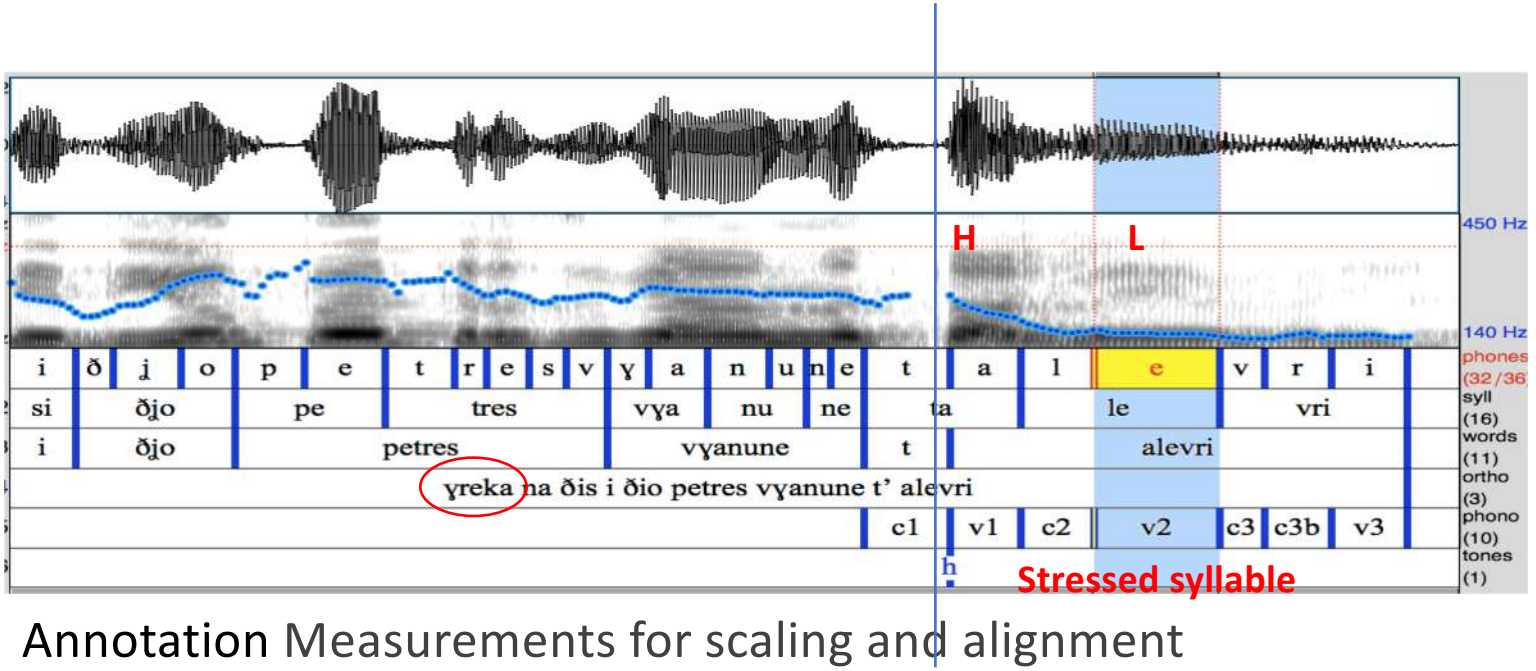
Methods: Recordings

- We draw on natural speech corpora because the sociolinguistic factors behind speakers' behaviour are not well understood
- No controlled experiments
- Data from pre-existing corpora from various sources of spontaneous (e.g., interviews, dialogues, narratives) and semi-spontaneous speech (map task, recitations). Date of recording 2001-2019
- A native speaker identified the relevant utterances, located the nuclear word and manually annotated the beginning and the end of the stressed vowel
- Broad focus utterances were selected only

Methods: Data and speakers

Language Variety	Declarative tokens	M speakers	Age range	F speakers	Age range
Athenian Greek	324	12	27-69	9	25-60
Cretan Greek	447	19	37-93	12	35-83
Venetian	833	10	18-65	11	18-40
Language Variety	**Polar q tokens**	**M speakers**	**Age range**	**F speakers**	**Age range**
Athenian Greek	273	6	40-86	6	35-82
Cretan Greek	135	17	32-84	14	35-83
Venetian	288	9	18-30	8	18-30

Traditional AM method of intonation analysis



Annotation Measurements for scaling and alignment

Labour intensive, time consuming, error prone. Prohibitive for large data bases—need for automation

Curve fitting alternative

Methods: Minimal annotation

- F0 contours converted to semitones
- Region of Interest = from the nuclear vowel start to the utterance end
- Manual annotation of vowel boundaries in Praat (Boersma & Weenink 2018)
- Automatic detection of relevant f_0 peaks and troughs
- Alignment of the turning points re the nuclear vowel

Methods: f_0 curve fitting

- Modelling the shape of the tunes using Legendre polynomial basis functions (here cubic ones)

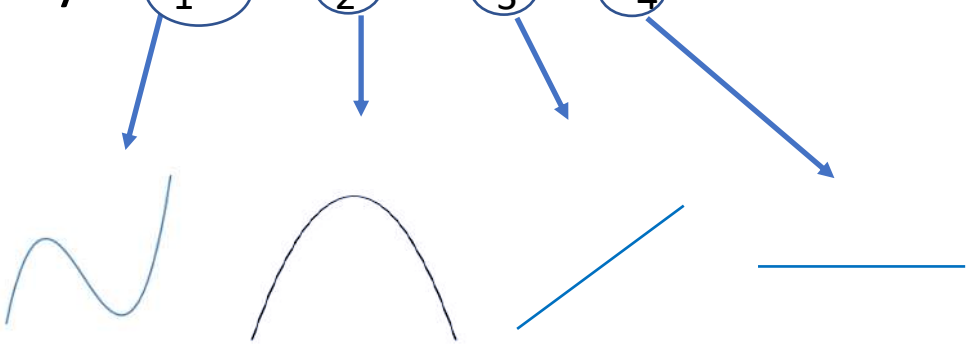
$$y = a_1x^3 + a_2x^2 + a_3x + a_4 + \varepsilon$$ (cf. Grabe, Kochanski & Coleman 2007)

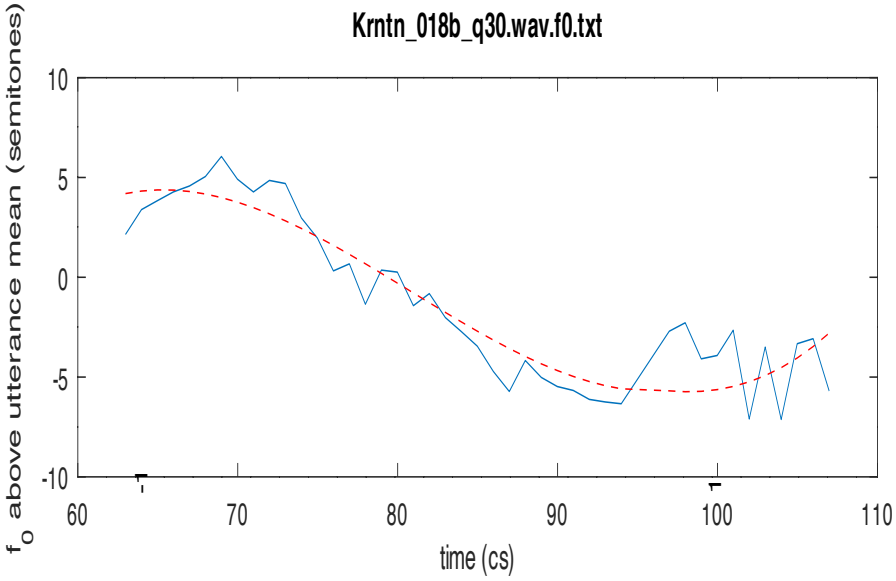
- Result: a model for the f0 of each dialect's tune

Methods: interpretation

- The low-ranking polynomials pick out slowly-varying properties and the higher-ranking polynomials pick out successively more rapidly varying properties

$$y = a_1x^3 + a_2x^2 + a_3x + a_4 + \varepsilon$$





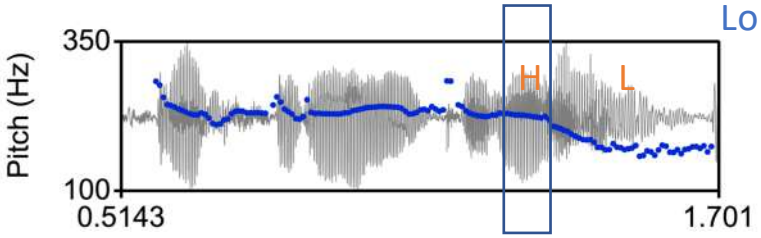
Methods: Comparisons

- For each tune we compared the region of interest of the three varieties (Athenian, Cretan, Venetian), the nucleus of utterance
- Kruskal-Wallis one-way analyses of variance with each of the first four coefficients, as well as the alignment values as dependent variables and *language variety* (with three levels: Athenian, Cretan, Venetian) as the independent variable
- Our general hypothesis is that Cretan declarative and polar question tunes will display similar intonational characteristics to Venetian Italian

DECLARATIVES

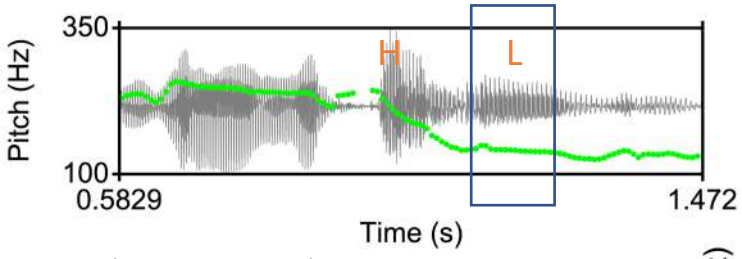
Examples: Declaratives in Athenian, Cretan, Venetian

H* L-L% or H*L L-L% for Athenian (e.g., Arvaniti & Baltazani 2005; Lohfink, Katsika & Arvaniti 2019)

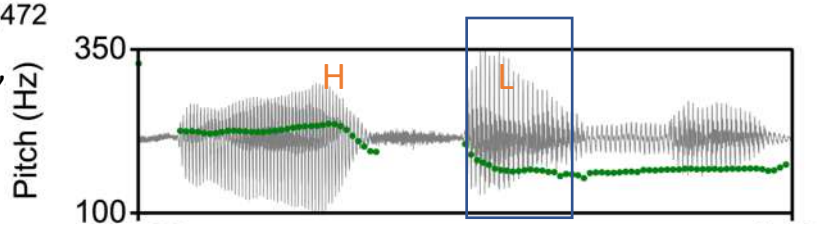


tuemfiˈliu poˈlemu “Of the civil war”

HL* L-L% for Cretan (Baltazani & Kainada 2019)



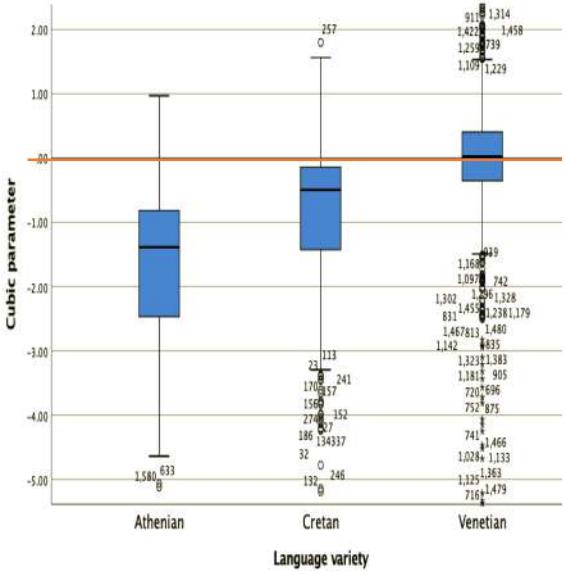
ˈvɣanune taˈlevri “They make flour’



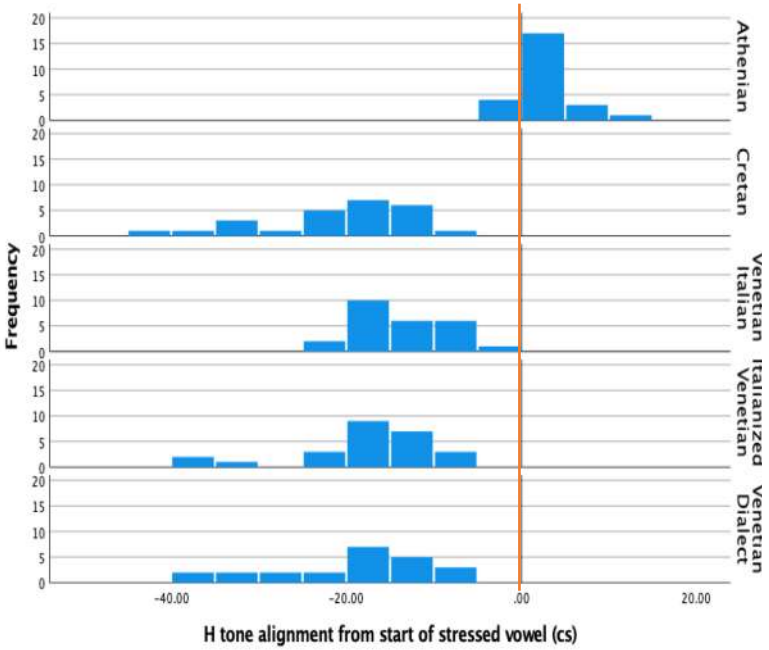
ˈfino del ˈfoʌo “The end of the sheet”

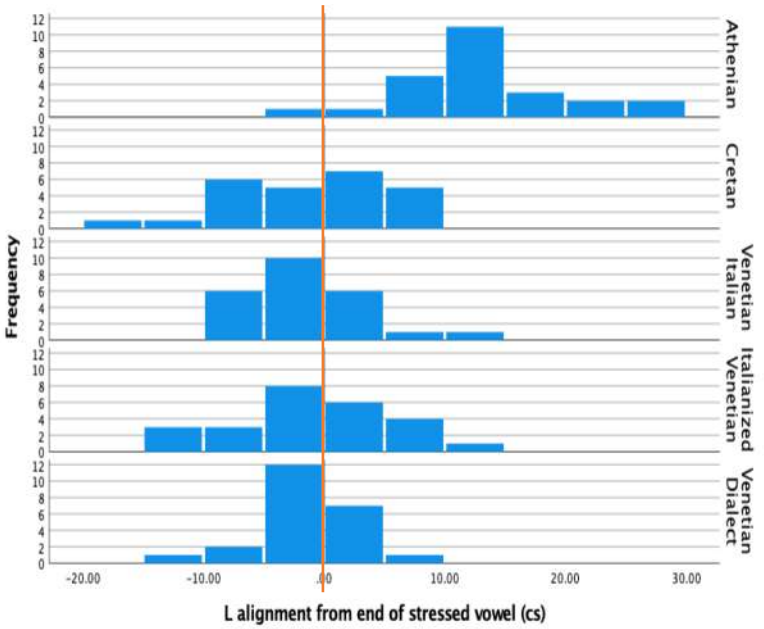
Little information on Venetian intonation (Di Russo 2011, not within the AM framework; Payne 2005 HL* L-L%)

Results: Declaratives



c_3 $\chi^2(2) = 22.94$, $p < 0.001$

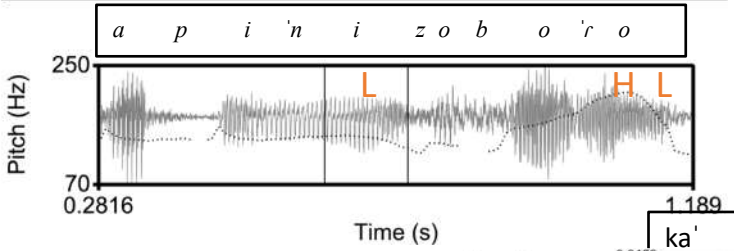


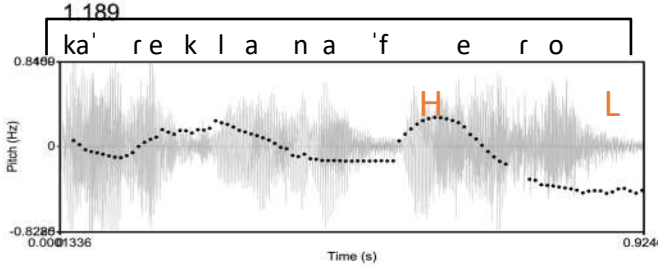


POLAR QUESTIONS

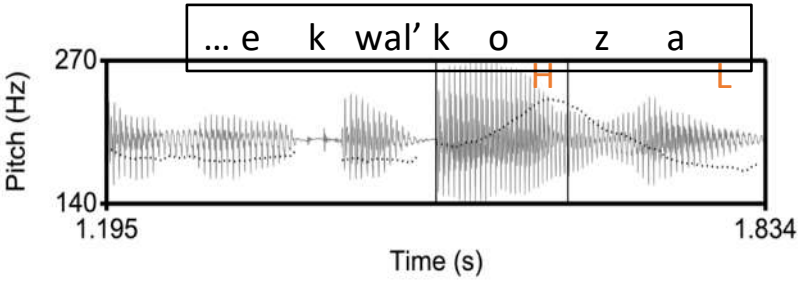
Examples: Polars in Athenian, Cretan, Venetian

Arvaniti, Ladd & Mennen (2006); Baltazani (2007)



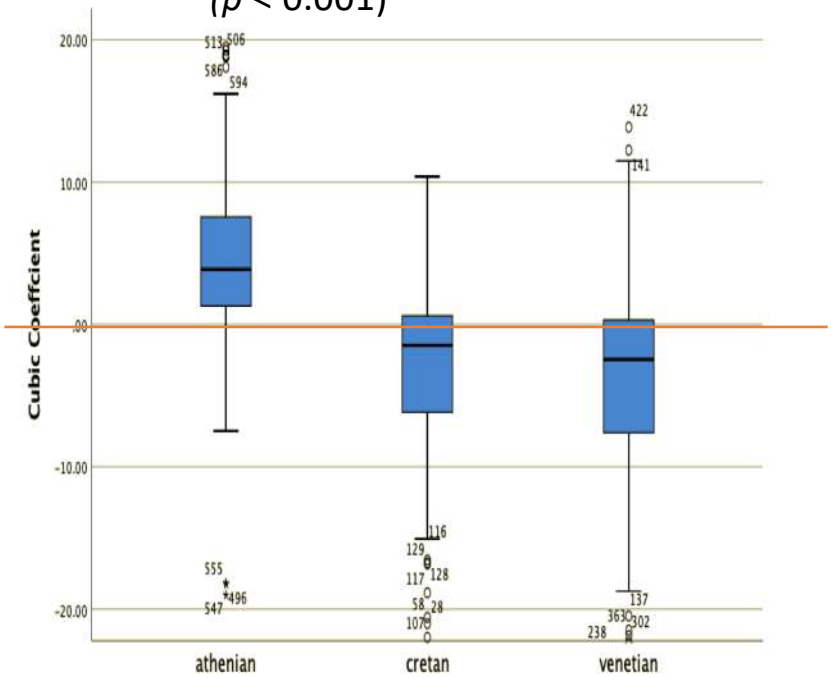


Savino (2012)

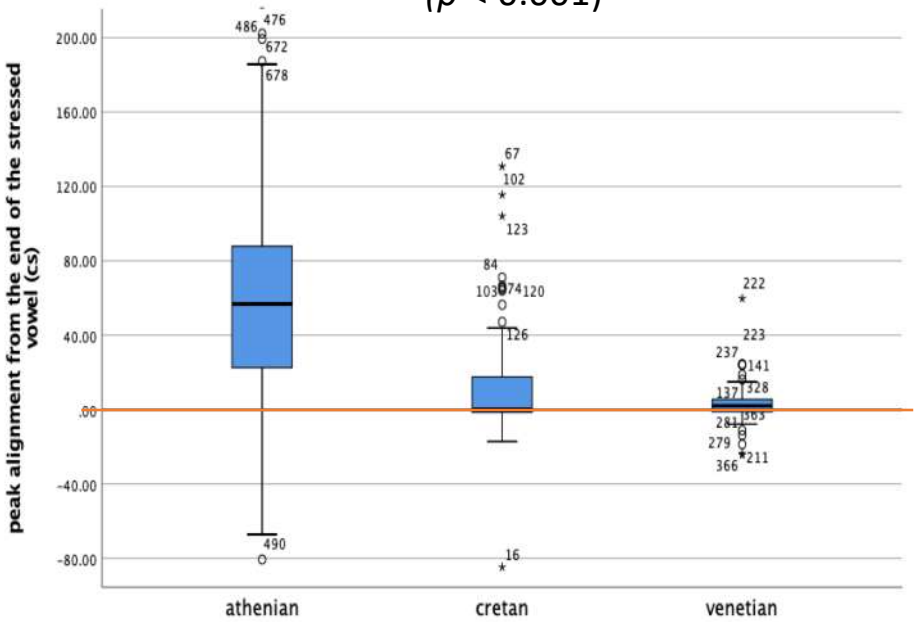


Results: Polars

($p < 0.001$)



($p < 0.001$)

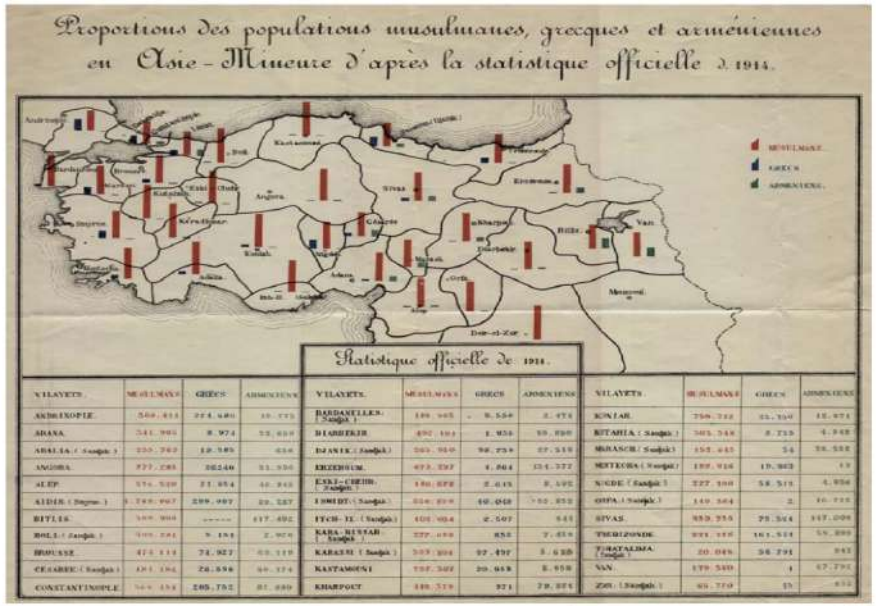


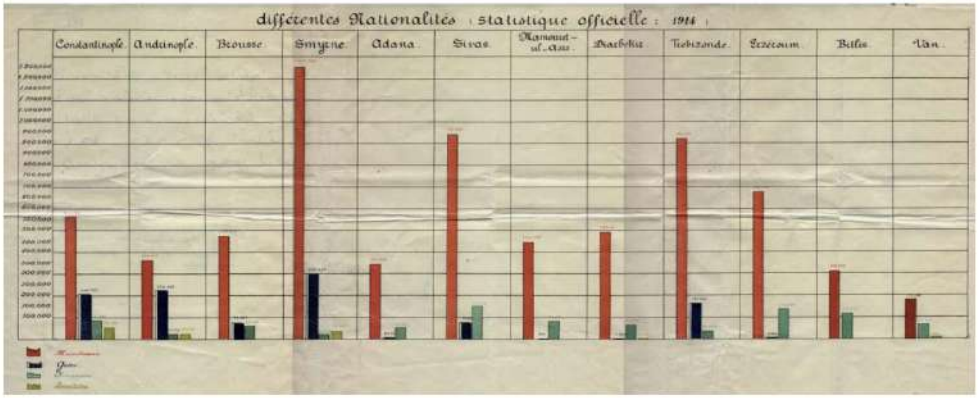
Discussion

- The intonation patterns of Cretan Greek declarative and polar question tunes are similar to those of Venetian
- They highlight the robustness of contact effects almost three and a half centuries after regular contact ceased
- Is this unexpected?
- In Crete, there was a long period of contact with Venice and little culture mixing with the Ottomans
- Preservation of the language patterns established in Crete during the Venetian period
- These speech patterns contribute to the distinct identity of Cretans

ATHENIAN – AMG – TURKISH STUDY

Contact with Turkish



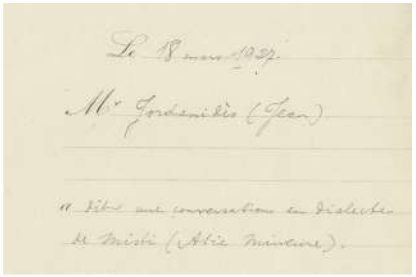


1923 Convention Concerning the Exchange of Greek and Turkish Populations

Asia Minor Greek (AMG) is spoken as a heritage variety in villages in northern Greece

Archival documentation

- This contact situation is much more recent so we were able to find older archival recordings from 1900s



From BNF

Background

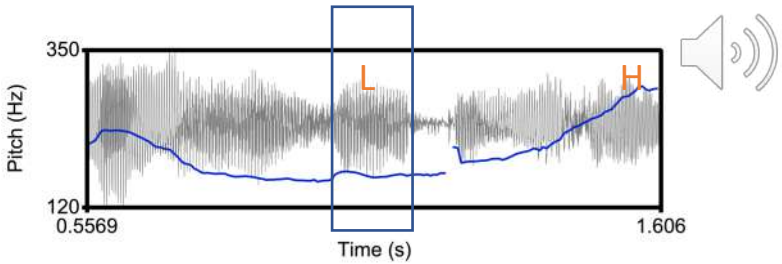
- Asia Minor Greek (AMG) speakers from Cappadocia
- 4 generations of AMG speakers; 1 gen born before 1923 and were Turkish-Greek bilinguals (Karatsareas 2011: ch. 2)
- AMG is a heritage variety (Montrul, 2016; Polinsky, 2018)
- N. Greece (Katsapis, 2011:71); 2nd, 3rd, 4th gen AMG speakers
- AMG refugees: more than ¼ of Greece's population in 1928 (Katsapis, 2011:126-129); viewed as an economic burden and marginalized (Gizeli, 1984)
- No intonational studies of dialectal differences for Turkish and few studies for the standard (Ipek & Jun, 2014; Göksel & Kerslake, 2005)

Methods

- 2977 continuation rise utterances from 111 speakers (71M, 40F)
- Native speakers aided with annotations
- Curve fitting
- Diachronic comparison for all three varieties

Variety	Total number of tokens	Gen 1	Gen 2	Gen 3	Gen 4
Athenian	838	255	210	272	101
AMG	1365	355	396	333	281
Turkish	774	470	98	95	111

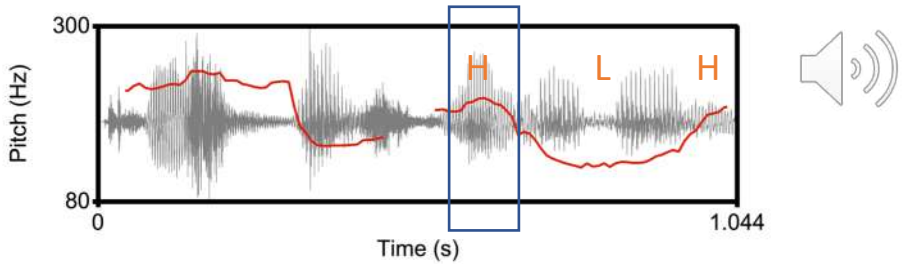
Continuation rise examples: Athenian and Turkish



eryaˈ**zo**tane "…she was working…"

Athenian continuation rise tune: L* H-

(Baltazani & Jun1999; Arvaniti & Baltazani 2005; Baltazani 2006)



kɨʃ baʃˈ**la**madan "Before winter starts"

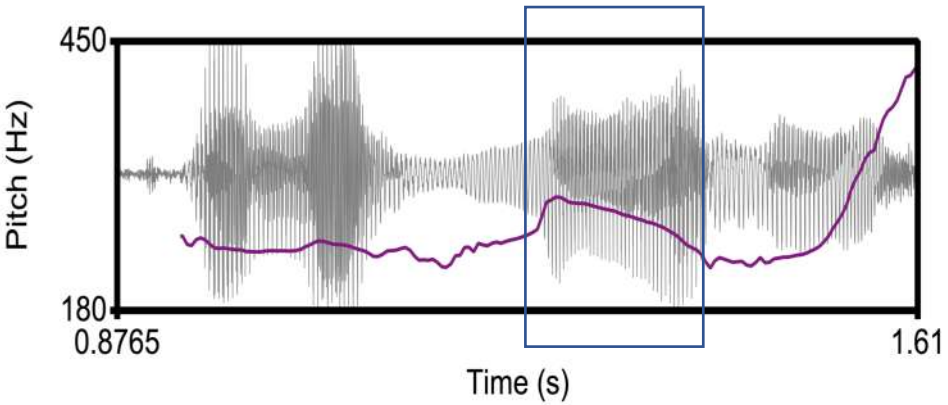
Turkish continuation rise tune: H*L H-

(Levi 2002; Göksel & Kerslake 2005; Özge & Bozsahin 2010; Ipek & Jun 2014)

AMGgen1 examples

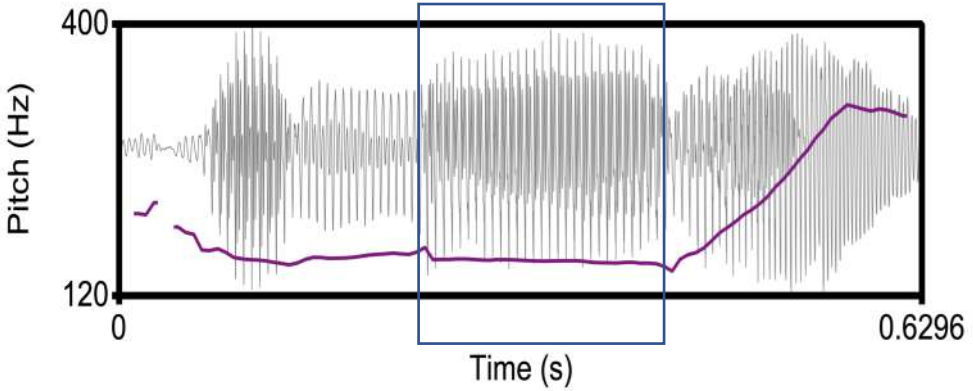
Turkish-like [xalaˈzm**e**nu]

‘broken’



Athenian-like [taˈm**e**ri]

‘the places’

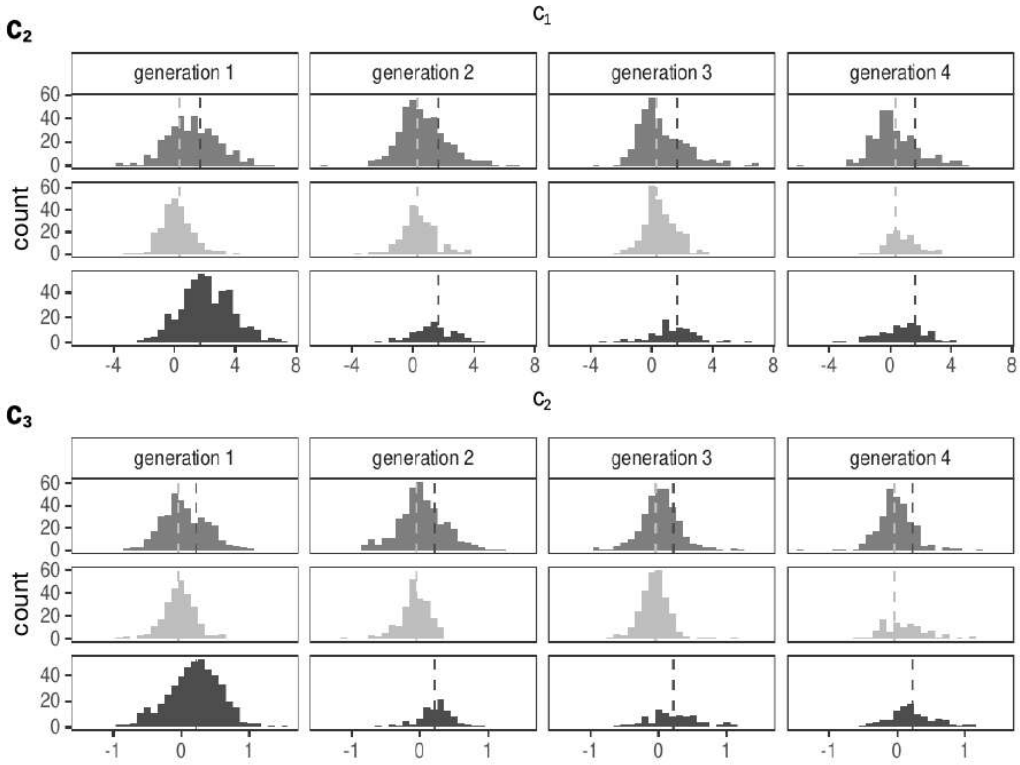


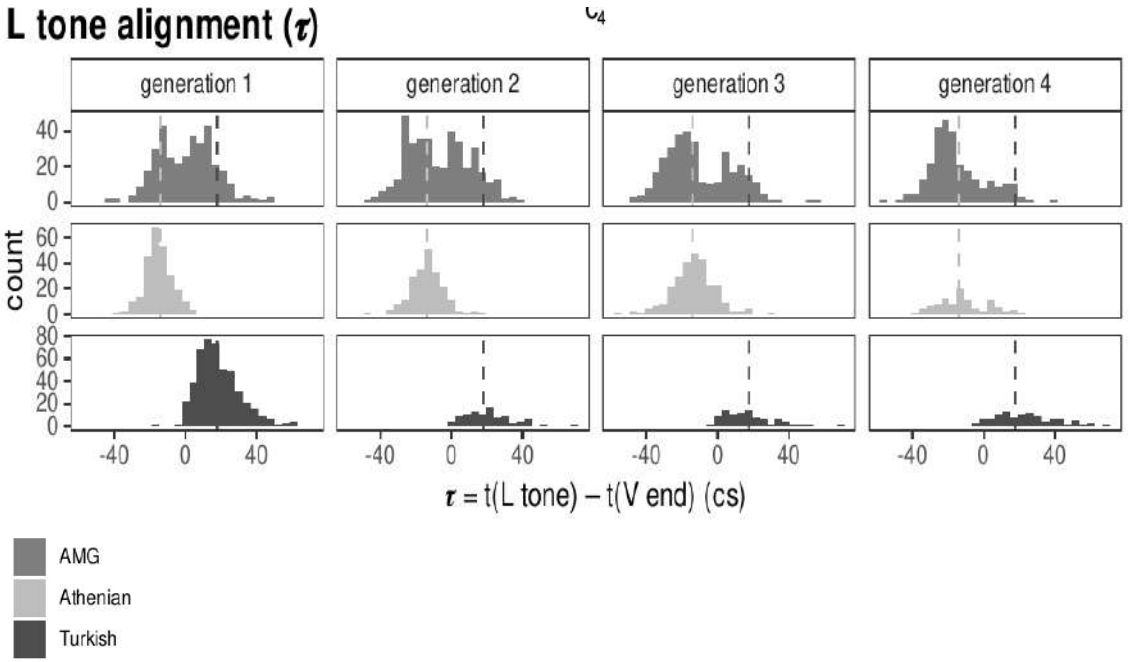
Most AMG speakers produced continuation rises with both Turkish-like and Athenian-like patterns

Comparison: Gaussian mixture model

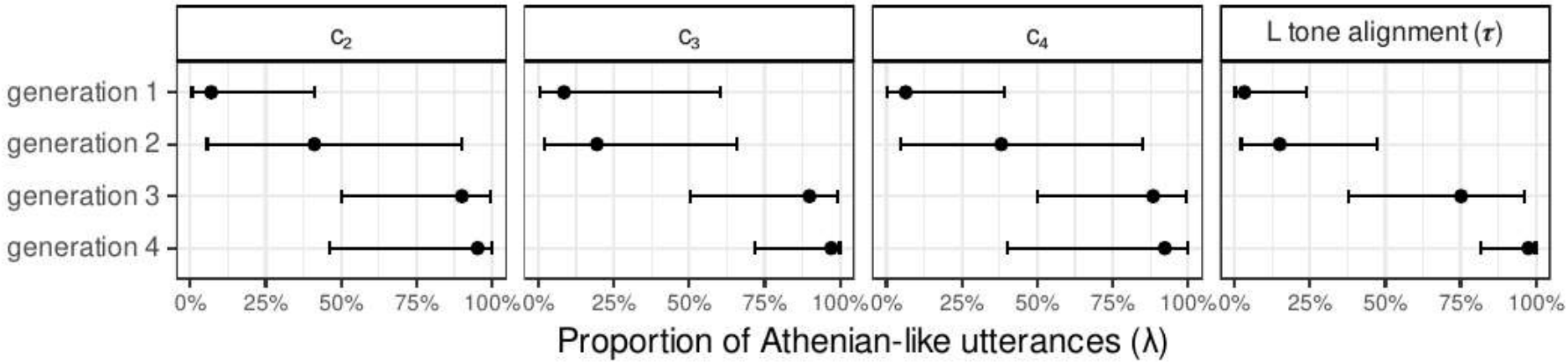
- Analysis with a Gaussian mixture model (e.g., Marin et al., 2005)
- Assumption that the distributions of shape coefficients in the AMG data are either Athenian-like (with a probability of λ) or Turkish-like
- What are the relative proportions of Turkish-like and Athenian-like utterances in AMG in each generation?
- Previous findings that first generation of AMG speakers used a mixture of Athenian-like and Turkish-like patterns (Baltazani et al., 2020).

Results 1


C1
C2
C3
C4
generation 1
generation 2
generation 3
generation 4
count


L tone alignment (τ)
generation 1
generation 2
generation 3
generation 4
count
τ = t(L tone) – t(V end) (cs)
AMG
Athenian
Turkish

Results 2


C2
C3
C4
L tone alignment (τ)
generation 1
generation 2
generation 3
generation 4
0%
25%
50%
75%
100%
Proportion of Athenian-like utterances (λ)

DISCUSSION

Diachronic change in AMG continuation rise

- The Turkish tune is a rise-fall-rise H*+L H-; alignment of the trailing L tone is 200 ms after the nuclear vowel offset
- The Athenian tune is a L* H-; alignment of the NPA L is 200 ms before the end of the nuclear vowel
- The analysis of approximately 3000 continuation rise tokens gave a consistent pattern of diachronic change in the realisation of the tunes
- The strong similarity to Turkish in AMG generation 1 weakens over time, with Athenian characteristics becoming predominant in generations 3 and 4
- Contact between Greek and Turkish resulted in phonological transfer of the pitch accent found in Turkish continuation rises into AMG

Different varieties, different contact results

- Why did the Turkish-like pattern diminish so much within 4 generations in AMG but the Venetian-like patterns in declaratives and polars were preserved in Cretan?
- The difference possibly lies in the different conditions after the end of contact
- For AMG possible influences are
  - the prestige of Athenian Greek,
  - the stigma that some attach to AMG
  - less exposure of young generations to AMG variety than earlier ones
- For Cretan there was no competing dominant variety for many years and the incorporated Venetian are part of their language

- The picture that emerges showcases the importance of social factors in the effects of language contact on intonation
- The effects of language contact on intonation are not a homogenous phenomenon but must be examined case by case taking many social factors into consideration
- This is a small step towards understanding intonational variation in Greek regional varieties—much more work is needed

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