MAPPING PROSODIC CONVERGENCE IN CYPRUS:
A GEO-HISTORICAL INVESTIGATION OF MULTILINGUALISM

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OVERVIEW

- Throughout history, languages have frequently come into sustained **contact** through migration and socio-political change, often > **multilingual societies**
- Effects of contact widely studied for range of linguistic features, but little known about consequences for **prosody**
- Prosody is particularly **elusive,** but recent advances in **modelling intonation** allow us to compare contours and evaluate possible sources of contact influence

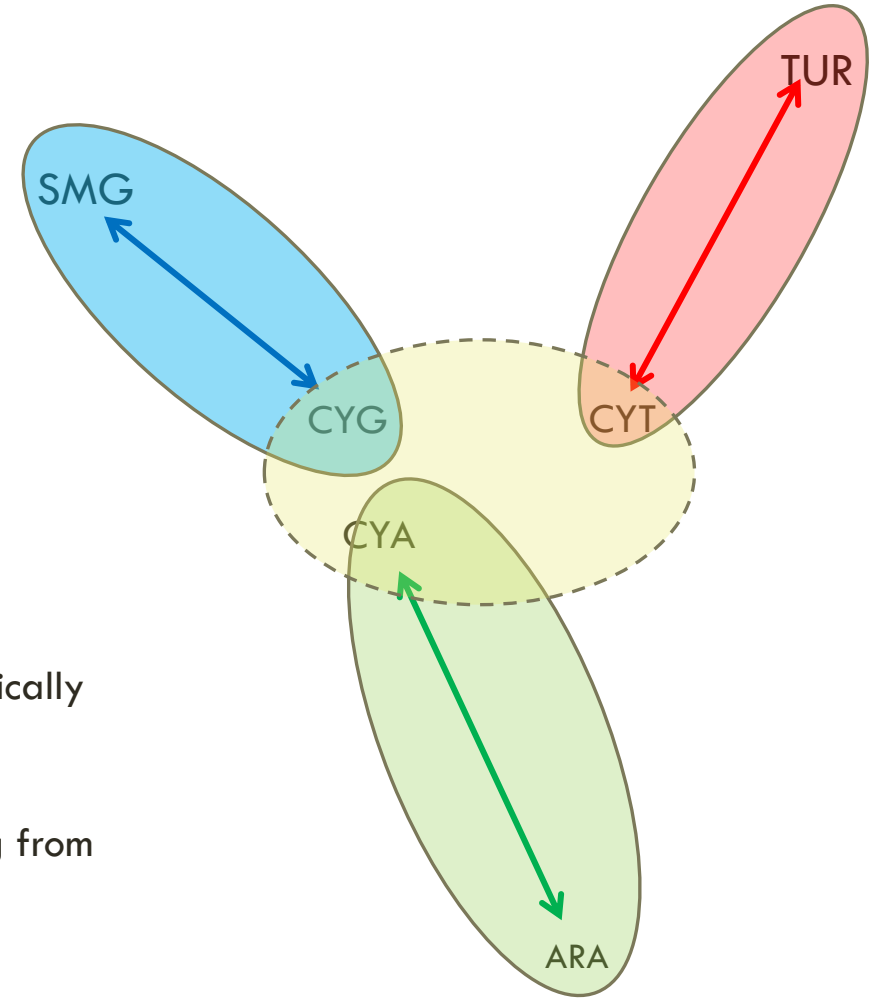
• Pilot project centres on **Cyprus**, as microcosm for historically and geo-politically complex wider area of Eastern Mediterranean

• Cypriot Greek, Turkish and Arabic reportedly sound similar, despite being from different language families and typologically distinct

• For a given set of prosodic features, e.g. polar question intonation:

1. Establish differences between Cypriot and non-Cypriot varieties (**divergence** resulting from geographical and historical isolation)

2.Compare across Cypriot varieties (potential **convergence** resulting from contact)



Today report some initial findings on differences and similarities between Cypriot Greek and SMG

RESEARCH TEAM

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BACKGROUND I: GEO-POLITICAL HISTORY

Cyprus at intersection of 3 continents

Exposed to multiple waves of rule and/or influence from all directions

- Mycenean: 12th century BC
- Phoenician, Egyptian, Assyrian, Persian, Macedonian, Roman
- Frankish, Venetian, Ottoman, British

> complex cultural and linguistic history

To what extent has this helped shape speech patterns in contemporary Cyprus?

BACKGROUND II: LINGUISTIC DIVERSITY

- Republic of Cyprus:
- Languages recognised as official: **Greek** and **Turkish**

- "Turkish Republic of Northern Cyprus:"
- Languages recognised as official: **Turkish**

- Everyday spoken languages: **Cypriot Greek** and **Cypriot Turkish**
  - Diglossia with standard varieties; dialect continua

- Recognised Minority Languages
  - Western Armenian (since 6th century; now 3000 speakers; language of instruction in some schools)
  - **Cypriot Arabic**: language of Maronites of Kormakitis

- Other minority languages, e.g.
  - Kurbetcha: language of Cypriot Roma (500-1000, mostly older speakers, in north; also speak CYT)

- Foreign languages (L2)
  - **English**: official use under British Rule. Taught at school; widespread knowledge
  - Several others, e.g. Russian

CYPRIOT GREEK

- South-eastern Greek dialect group
- Probably evolved from Hellenistic Greek, in isolation from other Greek dialects
- Influence from languages of other colonisers (Turkish, Middle French and English)
- Structurally 'conservative'
  - retaining medieval morphosyntactic features (e.g. wh clefts), and southeastern phonetic features (e.g. affrication/fronting of palatal fricatives, prenasalisation of plosives)
- Prior to 1974, used by many Turkish Cypriots too (sometimes as only language)
- Regional varieties undergoing levelling, post 1974 > emergence of pancyprian koine. In diglossic relationship with SMG

CYPRIOT TURKISH

- Turkish introduced to Cyprus with Ottoman conquest (1571)
- Post-Ottoman period > isolated from TUR and influence from CYG (and ENG)
- Relatively under-studied, but displays distinctive phonetic, morphological and syntactic features:
  - e.g. voicing of word-initial plosives, distinct tense forms (Kappler & Tsiplakou), SVO, Cypriot-specific use of particle mlș (Demir, 2003; Johanson, 2002), focus and wh clefts and rightward subordination (Kappler, 2008)
- Little known about regional varieties, but levelling is likely
- Diglossic relationship with TUR, with ongoing exposure to TUR varieties through settlers, media etc.

CYPRIOT ARABIC ('SANNA')

Spoken by around 900 of 6000 members of Catholic Maronite community, that came from the Levant in 7th -13th centuries

Evolved from hybrid of eastern Arabic dialects.

- Shares features with dialects of Levant, and with North Mesopotamian dialects

Isolation: purely oral dialect evolved with virtually no contact with other Arabic dialects after 12th century. All but unintelligible to speakers of other Arabic dialects

Heavily influenced by CYG (Trudgill & Schreier, 2006)

Speakers traditionally bilingual with CYG and CYA, though now in decline

Until 1974, most lived in Kormakitis area (north coast, now under Turkish control). After 1974, most moved to the south

CLIPS FROM 6 LANGUAGES

This the initial phrase "The north wind and the sun" from the story

Cypriot Greek

Cypriot Turkish

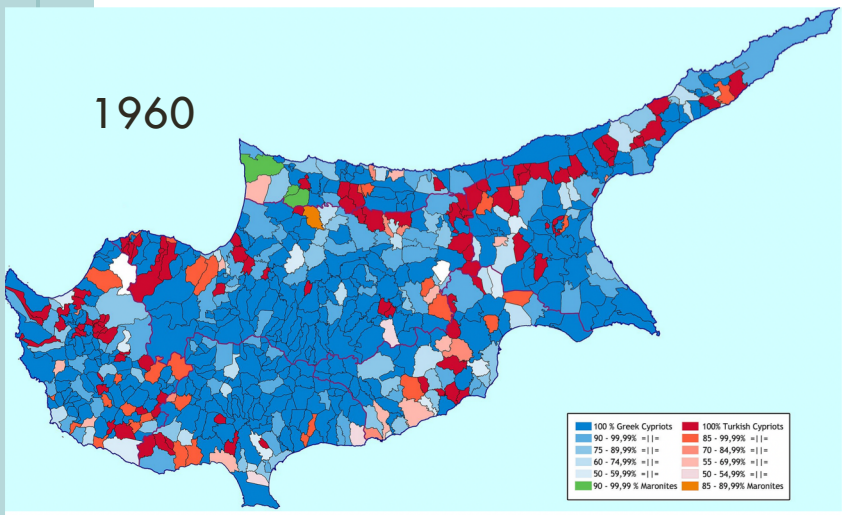
Cypriot Arabic

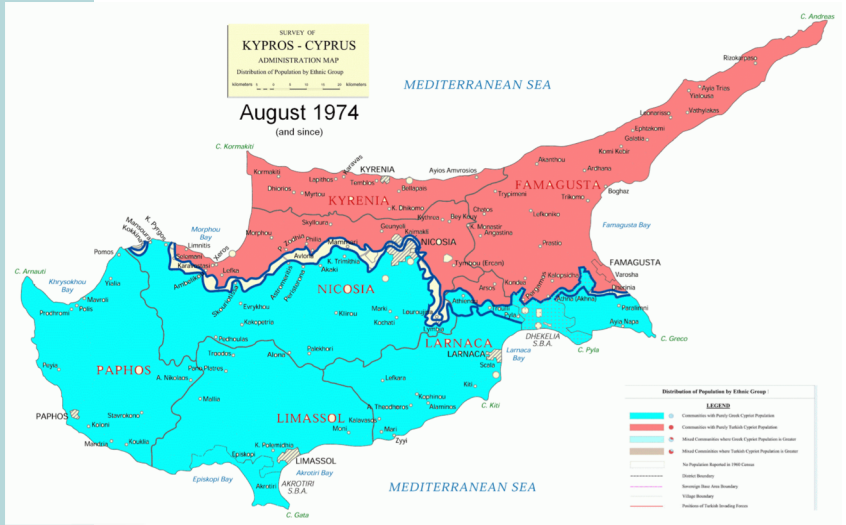
Greek

Turkish

Arabic

BACKGROUND III: GEOGRAPHY AND INTERNAL DISPLACEMENT





Varied **geography** of linguistic and ethnic groups (also in flux diachronically)

Mixed villages: varying degrees of societal multilingualism

After 1974, Cyprus divided into two linguistically near-homogeneous areas: Turkish-speaking north and Greek-speaking south

Very little contact between two languages

Continuing influence of SMG on CYG and TUR on CYT, and regional dialect levelling

How have these changes affected speech patterns?

EXPLORING CONTACT:

1. **Isolation from** other varieties of same languages

Establish non-Cypriot varieties as **benchmarks** to calculate degree and type of dissimilarity from Cypriot varieties

2. **Contact between** languages

Estimate similarities between Cypriot varieties, and identify possible markers of 'Cypriotness'

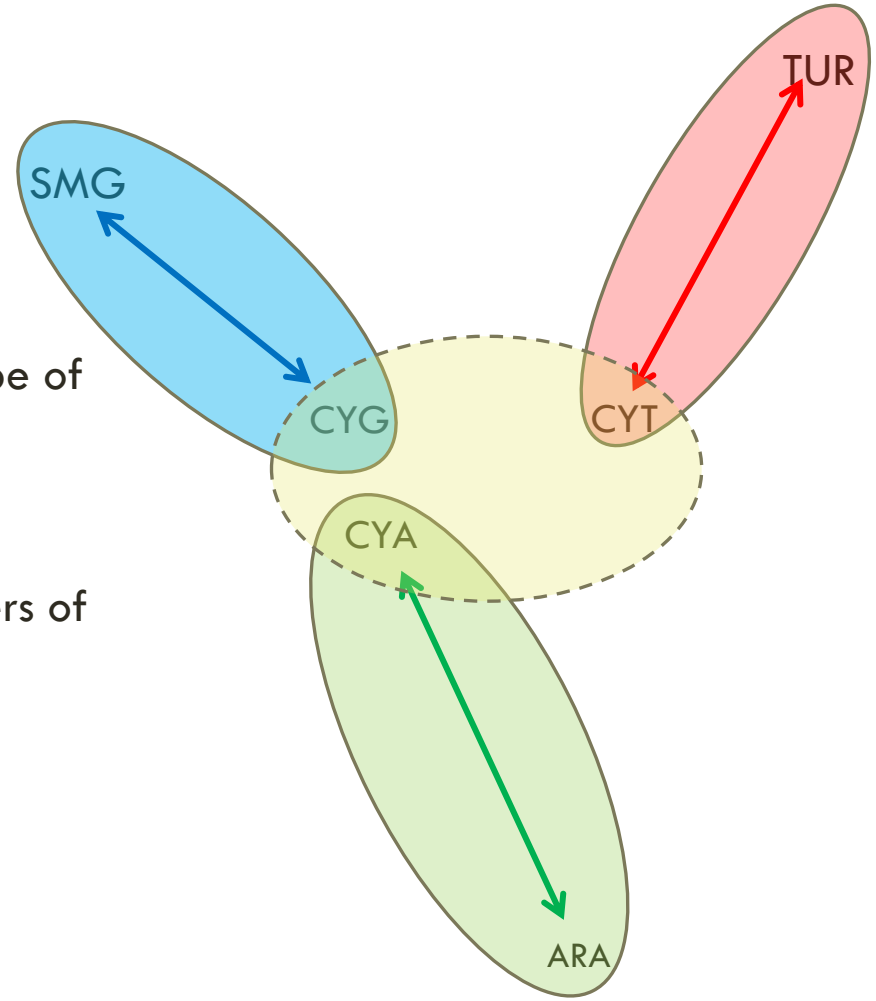
3. Change over **time**

Look at role of degree, **duration** and **frequency** of historical contact

4. Change over **place**:

Look at role of **geographical** and topographical variation within and across languages. Possibly geographically mediated; some locations more linguistically mixed

5. Investigate **perception**, and how this relates to identity markers



INTONATION AS OBJECT OF ANALYSIS

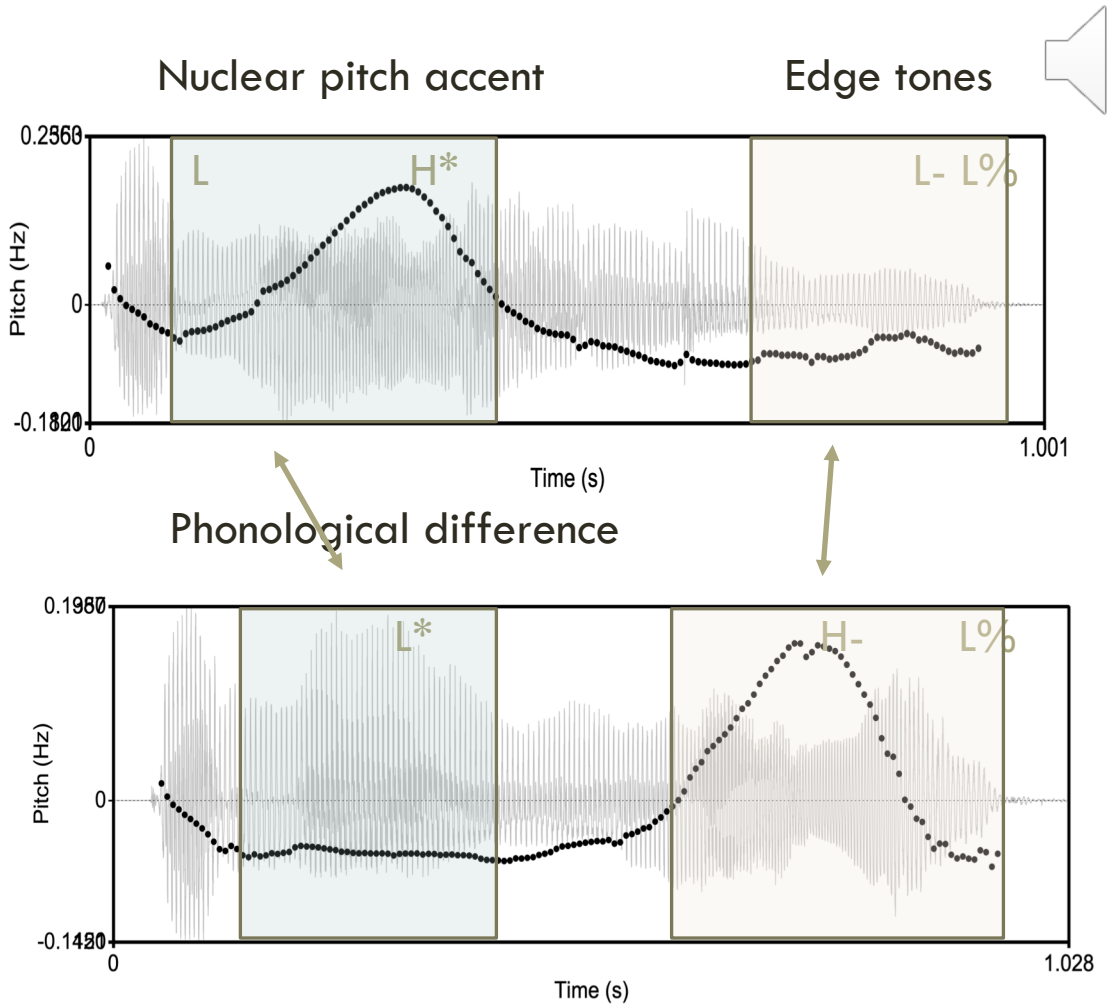
- Tune perceived as changes in pitch expressing illocutionary force
- Tune = pitch accents and edge tones
- f_0 synchronization with segments:
  - Alignment e.g., L H L

[piˈnai i eˈleni]

is-hungry the Eleni

“Eleni is hungry.” [statement, top]

“Is Eleni hungry?” [yes/no Q, bottom]



PRODUCTION EXPERIMENT

DESIGN

Languages: CYG, CYT, CYA, SMG, TUR, ARA
also ENG for younger speakers

Sentence types we elicit through different tasks:

- Statements with different focus structures (broad and narrow)
- Wh-questions (WHQs)
- Yes/no questions (YNQs)
- Continuation rises

EXPERIMENT TASKS

Picture prompts to avoid influences from written language and elicit more natural speech (Barnes & Michnowicz, 2015)

Task	Target utterance
Fairy tale	Statements, continuation rises
Picture naming	Broad/narrow focus statements, WHQs
Map task	YNQs
Spontaneous conversation	Statements, continuation rises

SPEAKERS

- Speakers of age in 1974 or born after 1990
- Questionnaire about social background

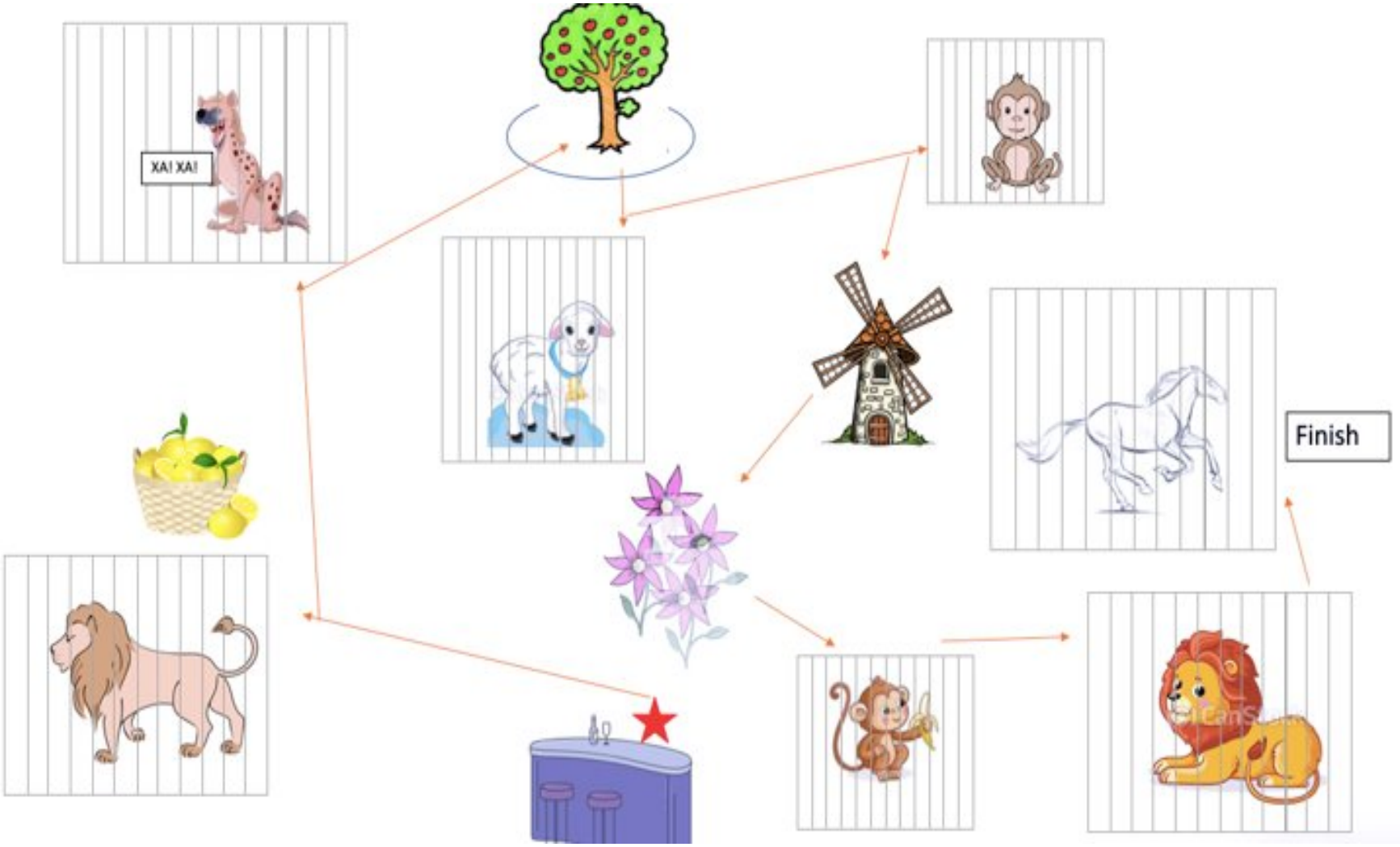
Recording place	Older		Younger		
	M	F	M	F	
Nicosia	5	5	10	10	
Larnaca	2	5	1	2	
Pafos	To be collected	To be collected	To be collected	To be collected	S
Limassol	To be collected	To be collected	To be collected	To be collected	
N. Nicosia	To be collected	To be collected	To be collected	To be collected	N
Kyrenia)	To be collected	To be collected	To be collected	To be collected	
Morphou	To be collected	To be collected	To be collected	To be collected	

TODAY

Language	Speakers	From	Education
ATH	3F, 1M	Athens	University
CYG	3F	1 Nicosia 1 Larnaca 1 Lapithos	University University Secondary

Number of tokens: ATH 77 + CYG 74 = 151 polar questions

MAP TASK: POLAR QUESTIONS EXPERIMENTER MAP



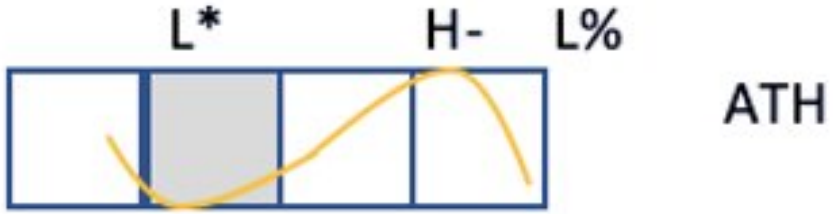
Experimenter map

MAP TASK: POLAR QUESTIONS PARTICIPANT MAP

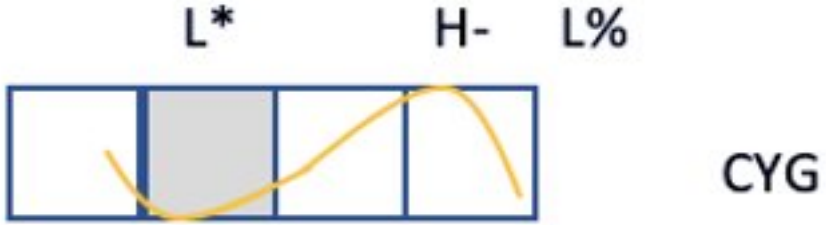
Participant map

LITERATURE ON ATHENIAN AND CYG YNQs

ATH: L* NPA, H- L% edge tones. (Arvaniti et al. 2006; Baltazani & Jun 1999; Baltazani 2007; Ladd 1996)



CYG: L* NPA, H-L% edge tones. (Arvaniti 1998; Grice et al. 2000; Themistocleous 2011; Themistokleous & Tsiplakou 2013)

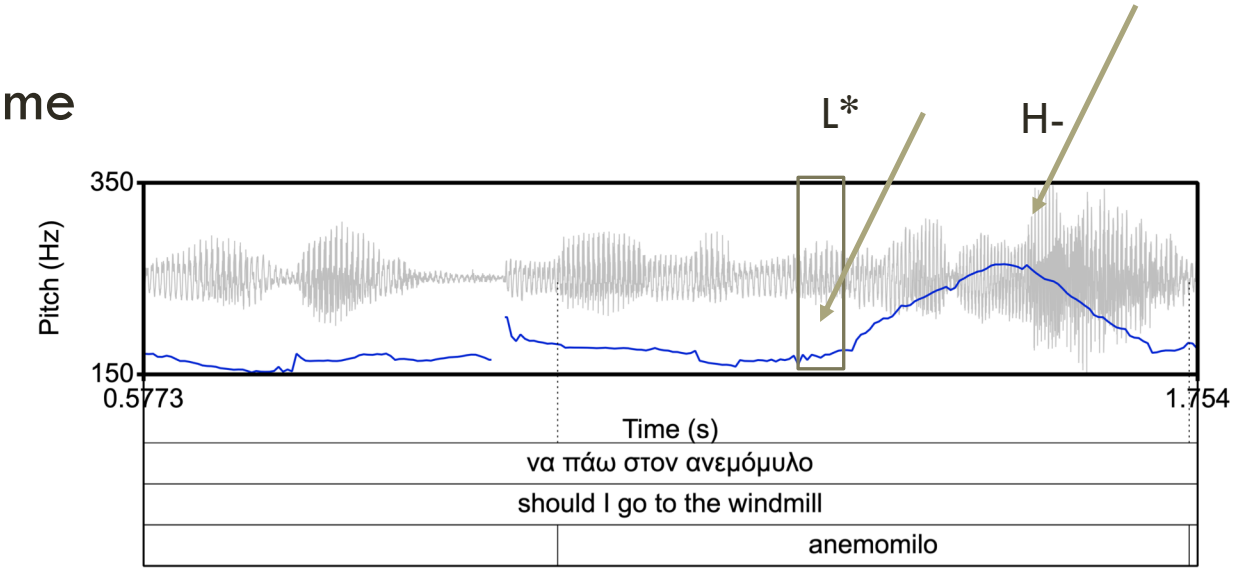


Shape is the same but H alignment is not always the same

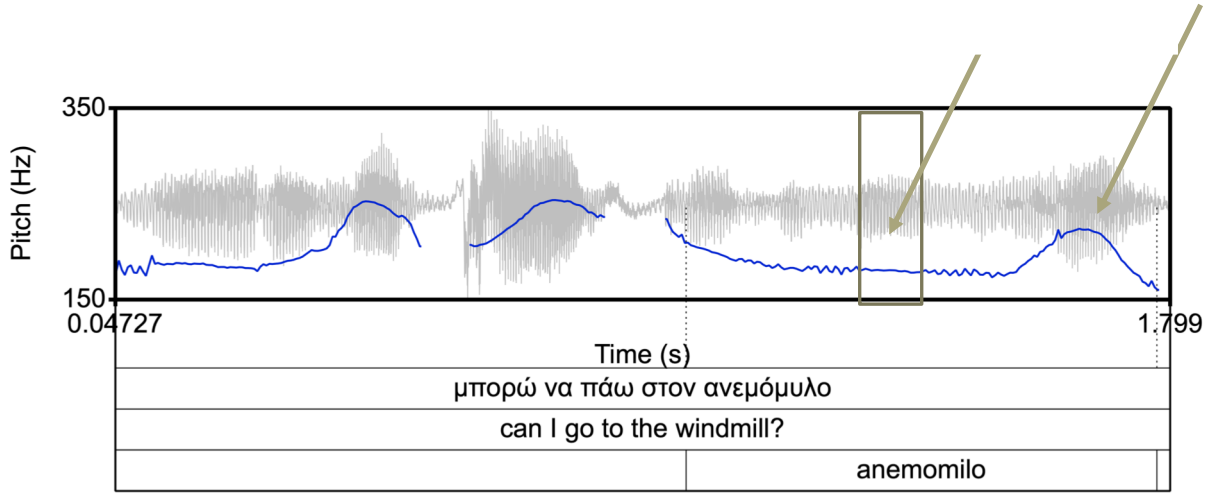
EXAMPLES FROM THE EXPERIMENT: FINAL NUCLEUS

Sound the same

Cypriot



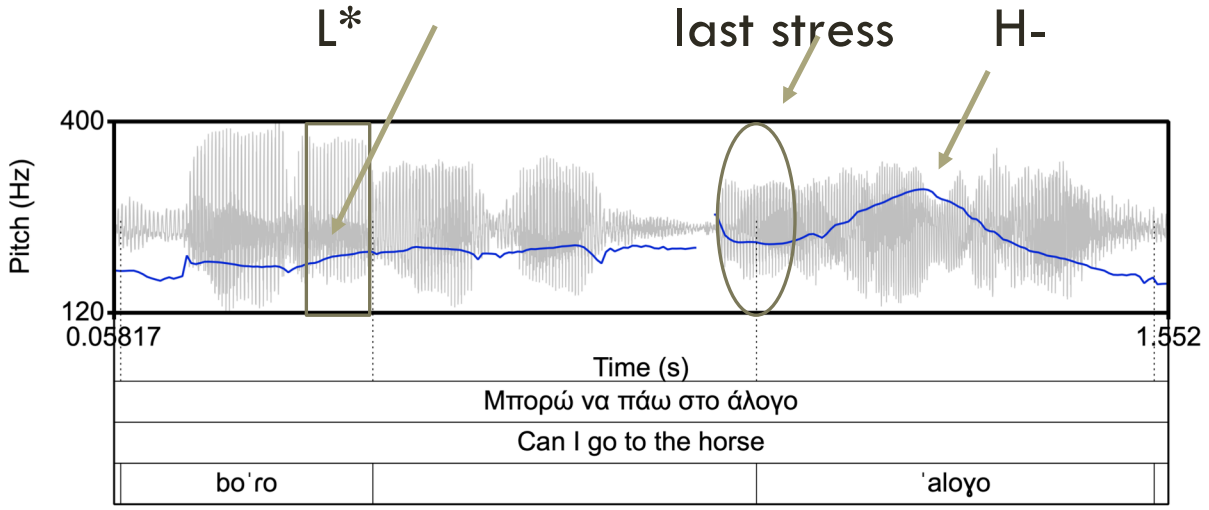
Athenian



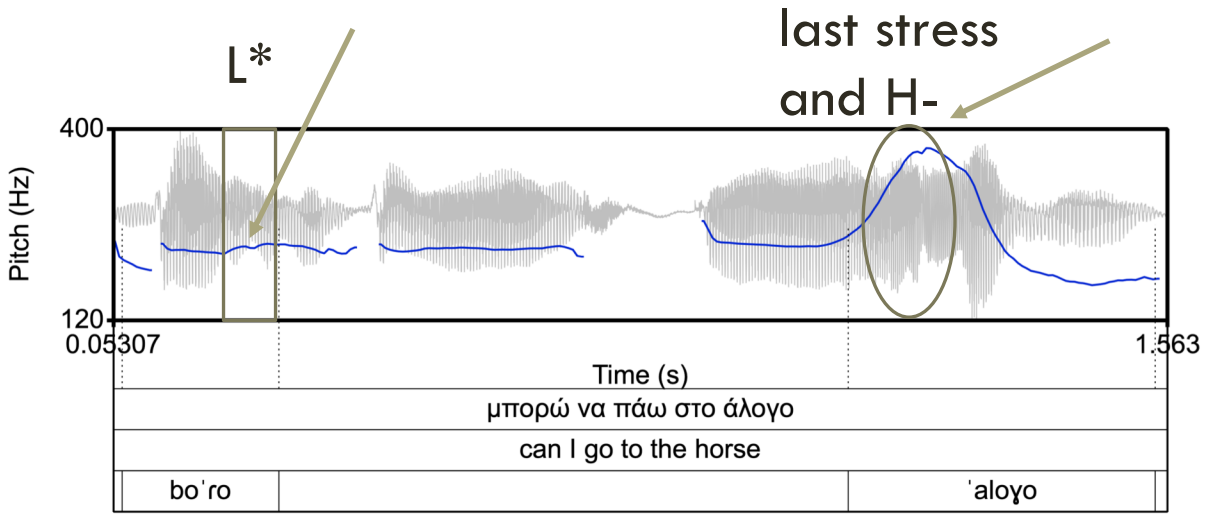
QUESTIONS PRODUCED IN THE EXPERIMENT: EARLY NUCLEUS

Sound different

Cypriot



Athenian



ANALYSIS: f_0 CURVE FITTING

- f_0 contours converted to semitones
- Region of Interest = from the nuclear vowel start to the utterance end
- Automatic detection of relevant *f*0 peaks and troughs
- Alignment of the turning points, L* and H- re the relevant vowel
- Model the shape of the tunes F0

(using quartic Legendre polynomial basis functions)

$$y = a_1x^4 + a_2x^3 + a_3x^2 + a_4x + a_5 + \varepsilon$$

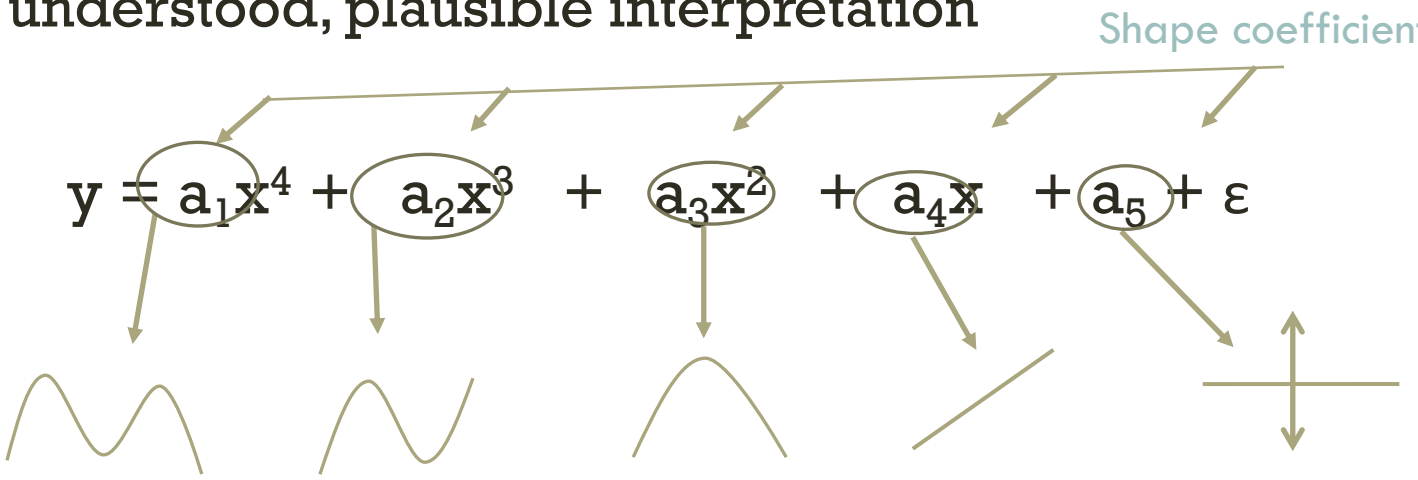
- Result: a model for the *f*0 of each token of the tune in each language's

Grabe, Kochanski & Coleman (2007); Gubian, Cangemi & Boves (2011); Lohfink, Katsika & Arvaniti (2019); de Ruiter (2011); Baltazani et al. (2022a, b)

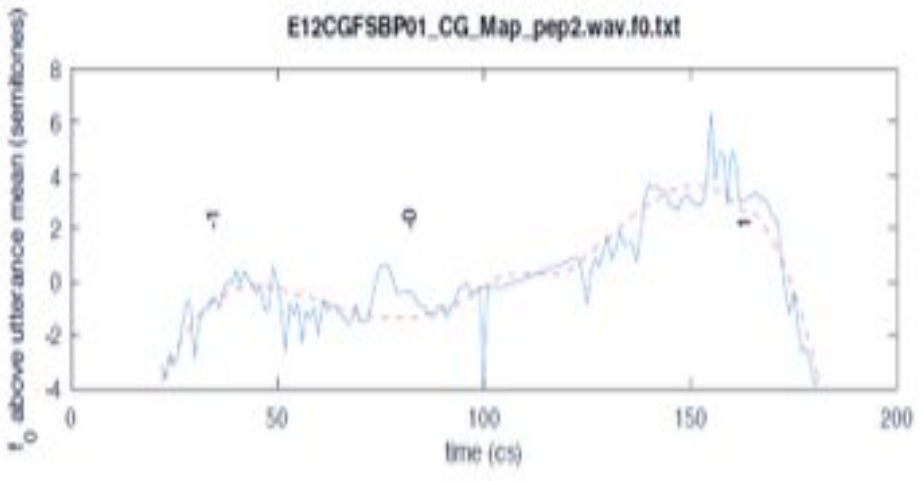
INTERPRETATION OF MODELLED CURVES

Automatic calculation of peaks and valleys for alignment

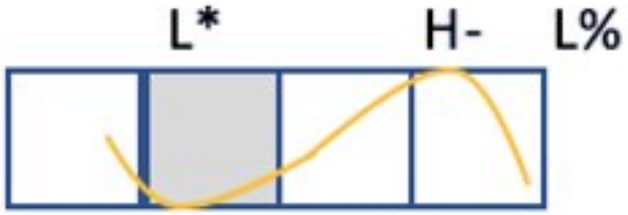
The terms capture simple properties of the fitted curve and have easily-understood, plausible interpretation



Curve fitting allows us to scientifically compare the intonation across the languages and quantify the degree of convergence. Mathematical formulas break down the intonation curves into numbers that can then be entered into a statistical analysis.



HYPOTHESES



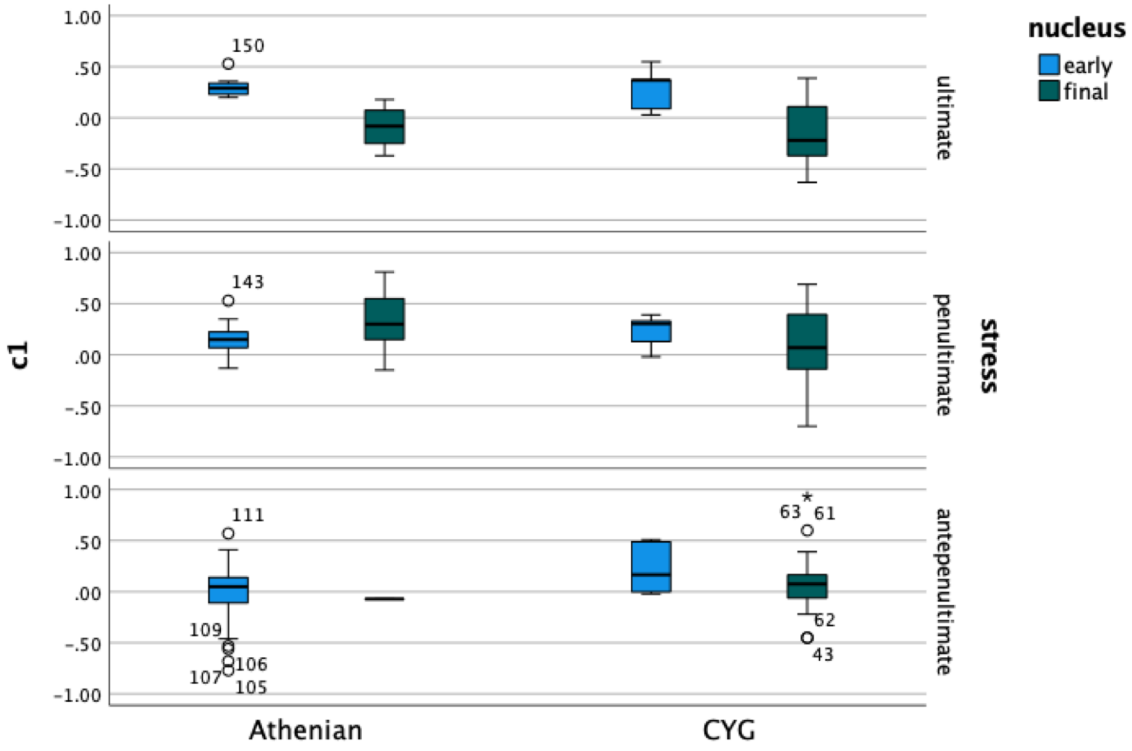
Based on previous literature and the impressionistic analysis we expect

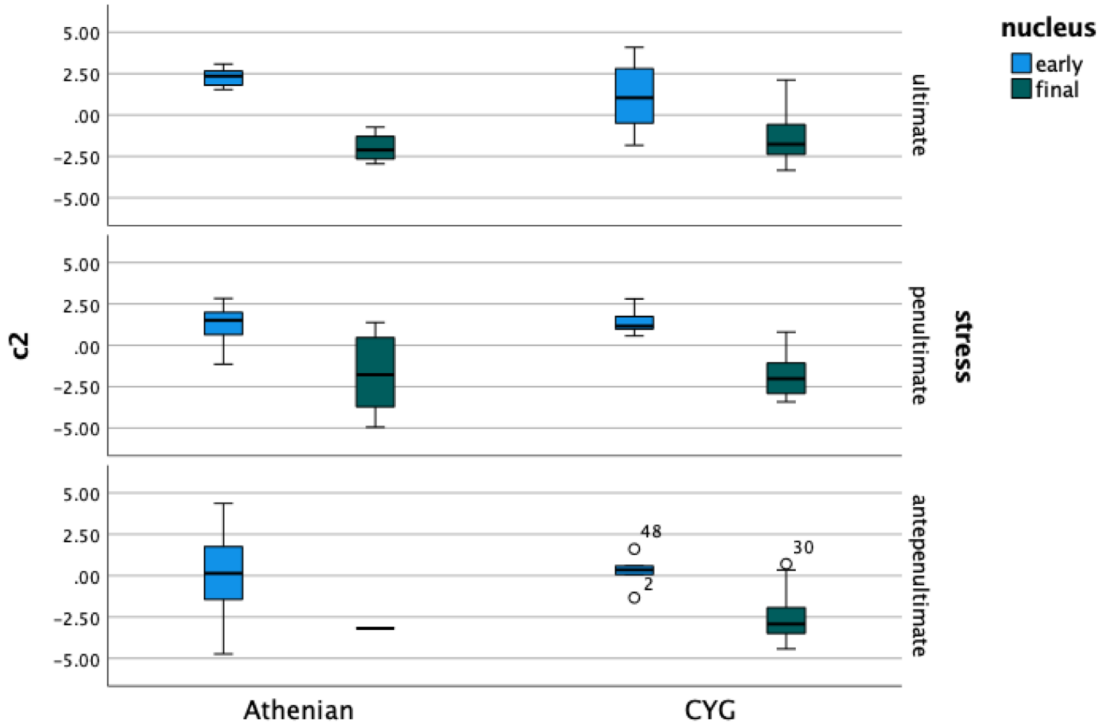
- ATH – CYG similarities: f_0 contour shape; L* alignment; H- alignment (FINAL NUCLEUS)
- ATH – CYG differences: H- alignment between ATH and CYG (EARLY NUCLEUS)

Dependent variables: Shape coefficients; L alignment; H alignment; Segment durations

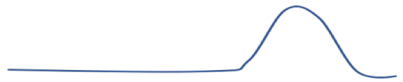
Independent variables: Language (ATH, CYG); Nucleus (EARLY, FINAL); Stress (ULTIMATE, PENULT, ANTEPENULT)

RESULTS: SHAPE COEFFICIENTS





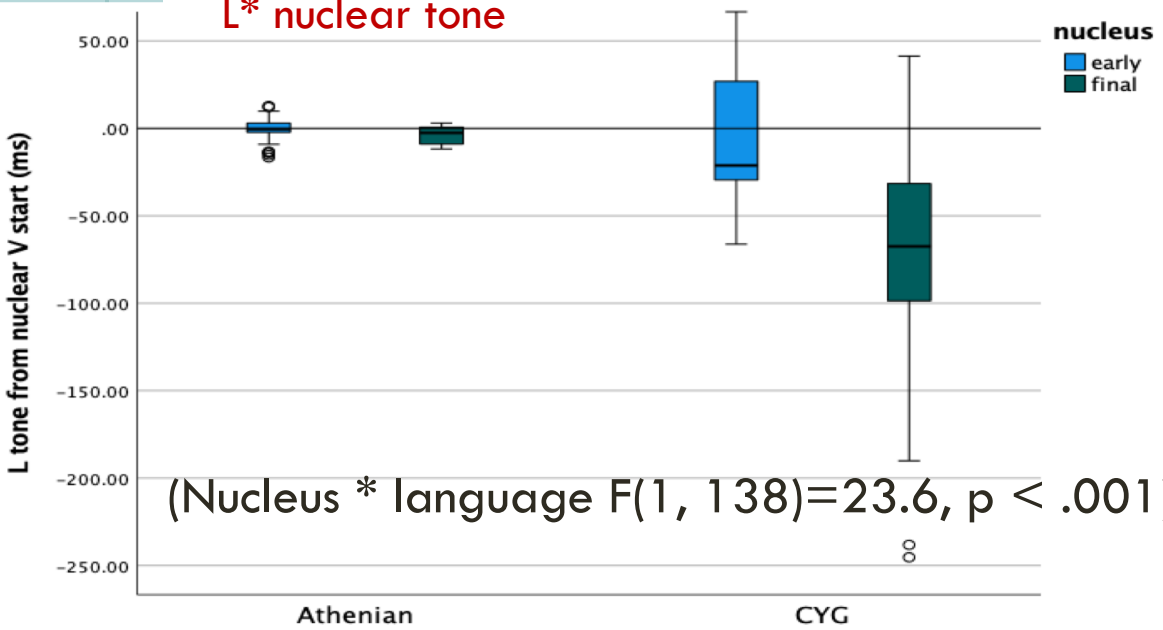
In general, no differences in shape due to LANGUAGE, but a difference due to NUCLEUS:

In both languages, Early =  Final = 

C1: $F(1, 139) = 5.7$, $p = 0.18$; C2: $F(1, 139) = 58.6$, $p < 0.001$

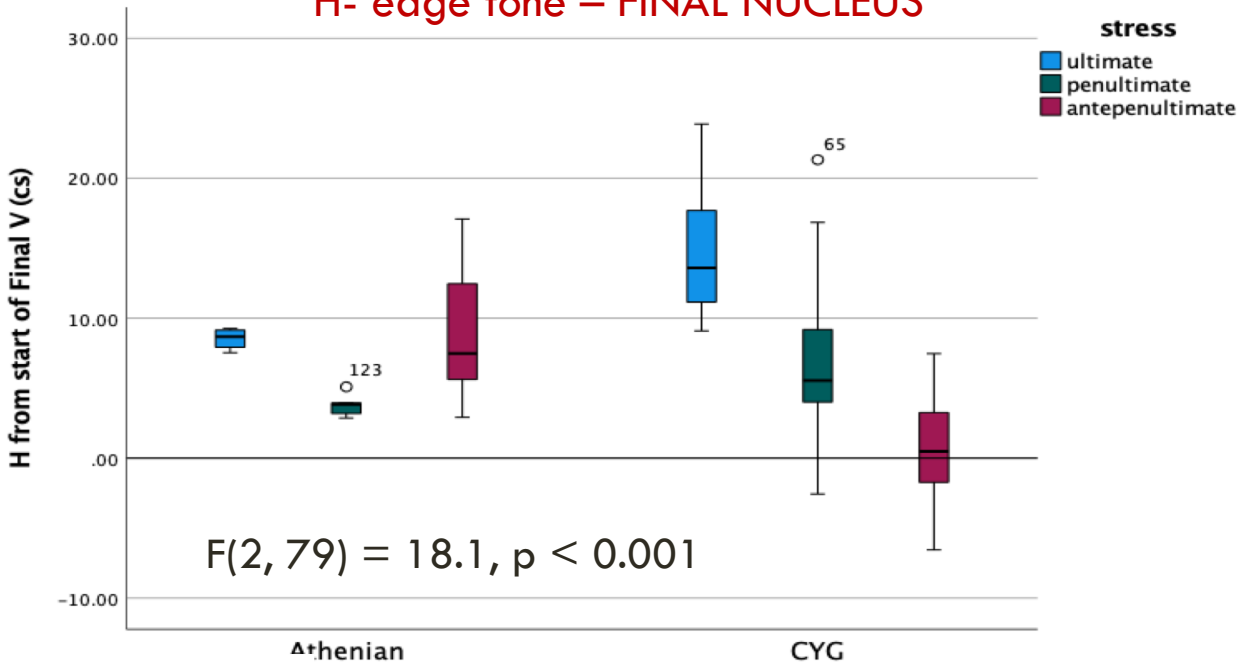
RESULTS: ALIGNMENT

L* nuclear tone



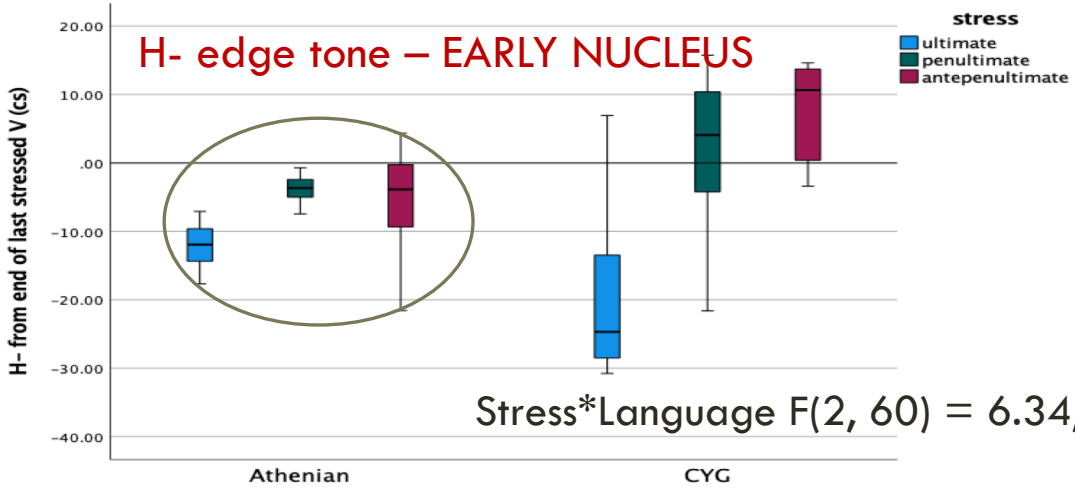
(Nucleus * language F(1, 138)=23.6, p < .001

H- edge tone – FINAL NUCLEUS



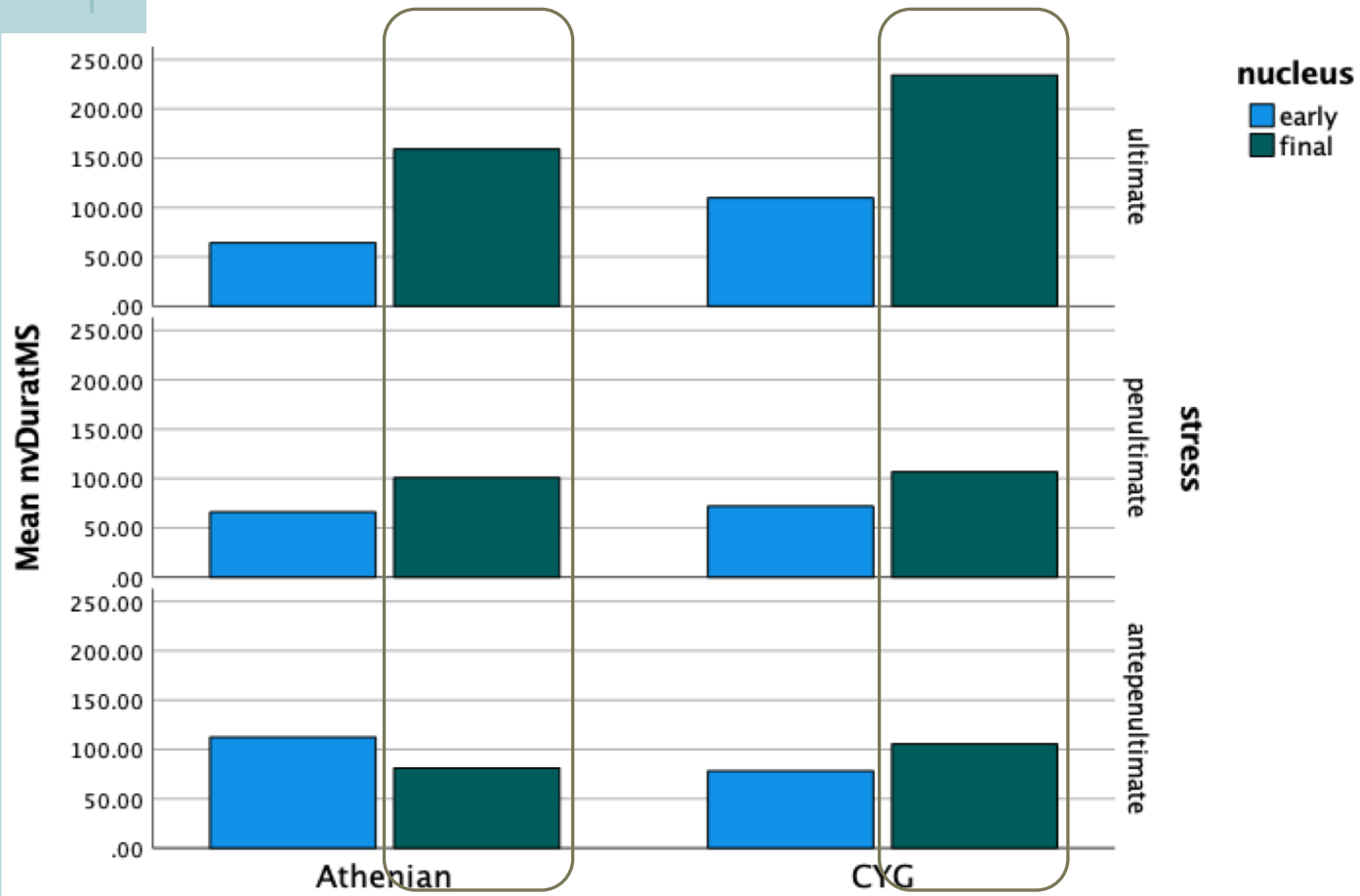
F(2, 79) = 18.1, p < 0.001

H- edge tone – EARLY NUCLEUS



Stress*Language F(2, 60) = 6.34, p = .003

RESULTS: NUCLEAR V DURATION



Effects of tonal crowding

The nuclear V is longer in FINAL than in EARLY condition

$F(1, 139) = 14.7, p < 0.001$

The nuclear V is longer in ultimate stress words

$F(2, 139) = 10.5, p < 0.001$

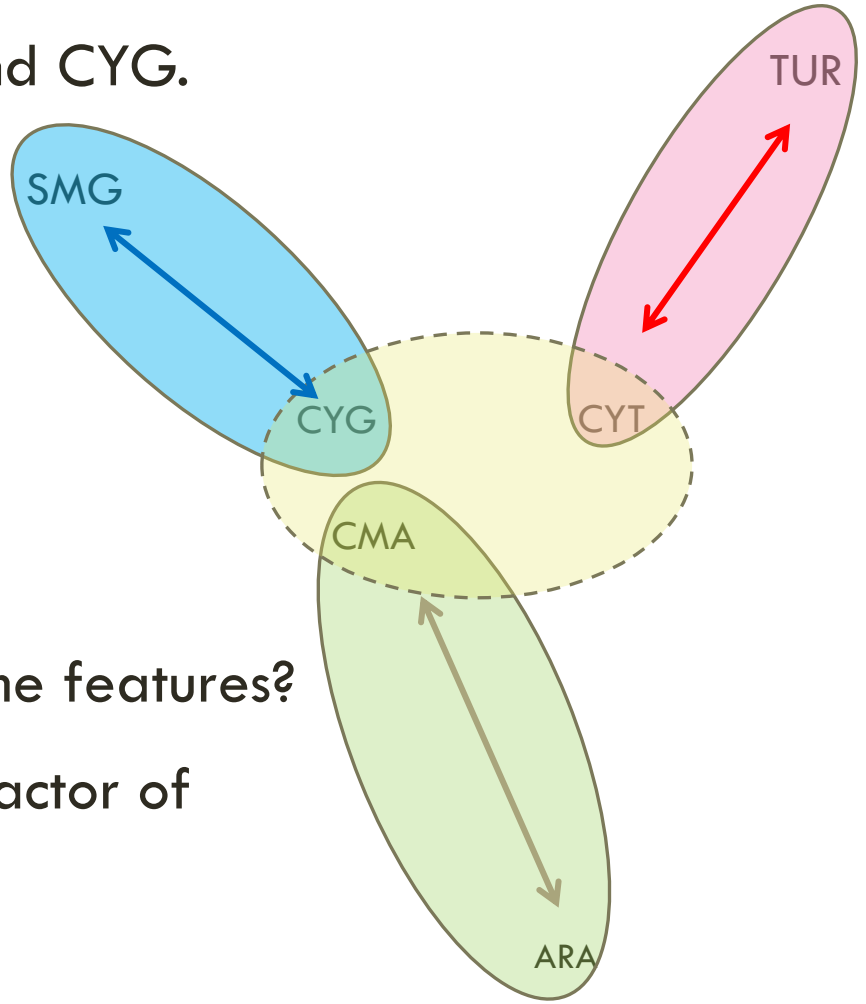
More V lengthening in CYG than Athenian in ultimate stress words

Language * stress: $F(2, 139) = 3.6$, $p = 0.29$

NEXT STEPS

Some differences, some similarities between ATH and CYG.

Are there differences between CYT and TUR?



If so, do CYG – CYT resemble each other in the same features?

That would be a strong argument for contact as a factor of intonational convergence on Cyprus

NEXT STEPS IN THIS PROJECT

1. Complete data collection for 6 sub-varieties

Not immediately clear which non-Cypriot varieties should form basis for comparison, especially:

- Turkish: start with Istanbul SMT, but is this nearest descendant from common ancestor with CYT?
- Arabic: closest from historical perspective? Another peripheral variety?

2. Complete analysis of key features

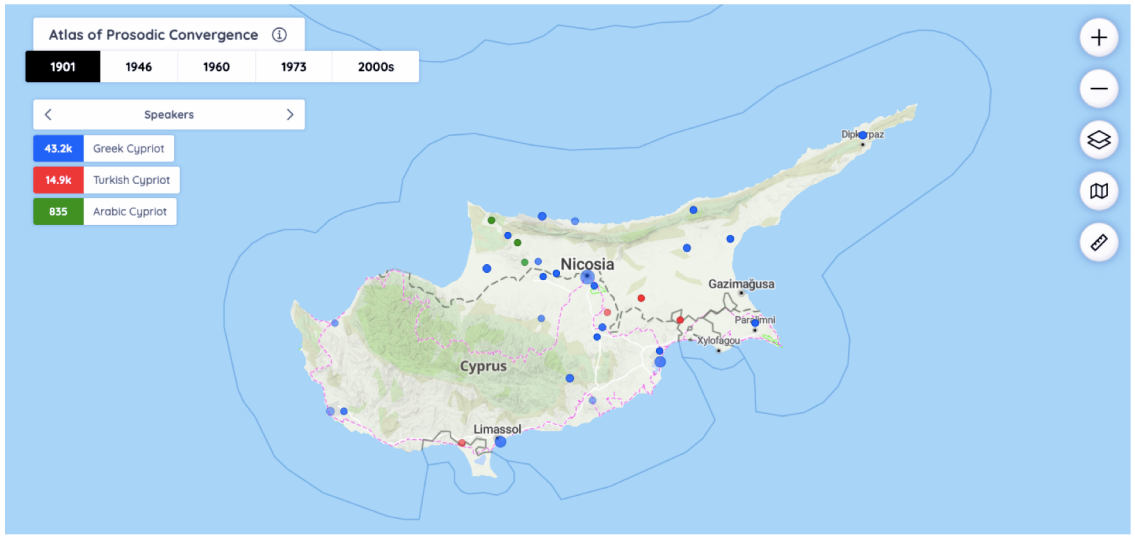
- Other aspects of intonation; final lengthening

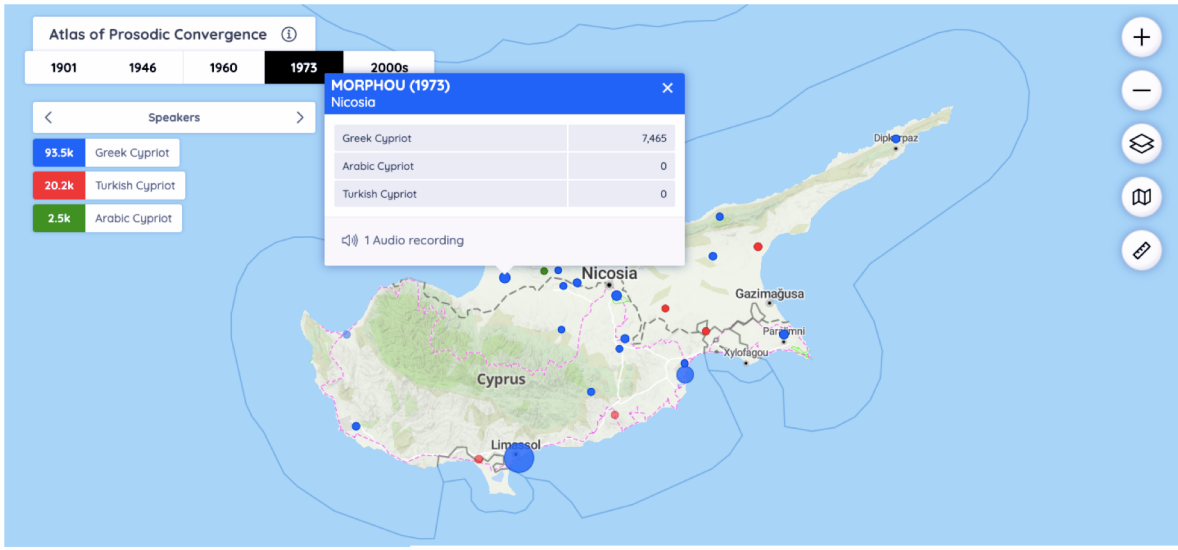
3. Perceptual testing

WIDER THEORETICAL QUESTIONS

1. Does contact affect prosody differently?
2. In addition to convergence, do we see other kinds of effect (e.g. innovation)?
3. Which aspects are most susceptible to change and which appear to be more stable?
4. How are changes affected by and incorporated into the grammar as a whole?
5. How do typological differences (e.g. in syntax) affect prosodic convergence?
6. How do we capture the dynamic sociolinguistic situation, which is also impacted by other types of migration (including urbanisation, diaspora, immigration), and integrate these in a historical and geographical framework?

MAPPING PROSODY: DIGITAL ATLAS





https://rsimon.github.io/peripleo-oxford/#/7.79/33.2341/35.0153/facet=speakers

Crucial source of data from PRIO:

'Internal Displacement in Cyprus: Mapping the Consequences of Civil and Military Strife', (Europeaid/127215/L/ACT/CY)

http://www.prio-cyprus-displacement.net/default.asp?id=245

Investigators: Ayla Gürel, Mete Hatay, Nicos Trimikliniotis, Olga Demetriou

AGIA VARVARA

Click Here for Map

Agia Varvara is a village in the Paphos district, located ten kilometers southeast of Paphos (Ktima) and three kilometers northwest of Anarita. Agia Varvara means "Saint Barbara" in Greek. Turkish Cypriots adopted the alternative name of Engindere in 1958. It literally means "vast stream."

YEARS	TC	GC	OTHERS	TOTAL
1831*	ns	ns		ns
1891	123	50		173
1901	93	56		149
1911	108	49		157
1921	98	67		165
1931	96	68		164
1946	128	100		228
1960	130	99		229
1973	88	29		117
1976	-	57**		57
1982	-	51**		51
2001	-	39**		39

*In 1831 census only males were counted.
** De jure population (including other nationals)

THANK YOU FOR LISTENING!