Diachrony, intonation and language contact in Greek

Mary Baltazani
University of Oxford
The *Greek in contact* project  [https://greekincontact.phon.ox.ac.uk/](https://greekincontact.phon.ox.ac.uk/)

June 2018 – March 2022

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

Collaborators

Spyros Armostis  
John Coleman  
Lazaros Kotsanidis  
Pavel Logačev  
Dimitris Papazachariou  
Elisa Passoni  
Joanna Przedlacka  
Clio Takas  
Özlem Ünal
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

[p'i'naɪ i ɪ'leɪni]

“Eleni is hungry.”

“Is Eleni hungry?”

07/04/2022 Linguistics Seminars -- University of Athens
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

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* (Kontosopoulou 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 $\rightarrow$ Italianized Venetian (Grassi 1993) $\rightarrow$ 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

<table>
<thead>
<tr>
<th>Language Variety</th>
<th>Declarative tokens</th>
<th>M speakers</th>
<th>Age range</th>
<th>F speakers</th>
<th>Age range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athenian Greek</td>
<td>324</td>
<td>12</td>
<td>27-69</td>
<td>9</td>
<td>25-60</td>
</tr>
<tr>
<td>Cretan Greek</td>
<td>447</td>
<td>19</td>
<td>37-93</td>
<td>12</td>
<td>35-83</td>
</tr>
<tr>
<td>Venetian</td>
<td>833</td>
<td>10</td>
<td>18-65</td>
<td>11</td>
<td>18-40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language Variety</th>
<th>Polar q tokens</th>
<th>M speakers</th>
<th>Age range</th>
<th>F speakers</th>
<th>Age range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athenian Greek</td>
<td>273</td>
<td>6</td>
<td>40-86</td>
<td>6</td>
<td>35-82</td>
</tr>
<tr>
<td>Cretan Greek</td>
<td>135</td>
<td>17</td>
<td>32-84</td>
<td>14</td>
<td>35-83</td>
</tr>
<tr>
<td>Venetian</td>
<td>288</td>
<td>9</td>
<td>18-30</td>
<td>8</td>
<td>18-30</td>
</tr>
</tbody>
</table>
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)

\[ y = a_1 x^3 + a_2 x^2 + a_3 x + a_4 + \varepsilon \]  
(c.f. 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

\[ y = a_1 x^3 + a_2 x^2 + a_3 x + a_4 + \varepsilon \]
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)

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

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)
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); 2\textsuperscript{nd}, 3\textsuperscript{rd}, 4\textsuperscript{th} 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

<table>
<thead>
<tr>
<th>Variety</th>
<th>Total number of tokens</th>
<th>Gen 1</th>
<th>Gen 2</th>
<th>Gen 3</th>
<th>Gen 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athenian</td>
<td>838</td>
<td>255</td>
<td>210</td>
<td>272</td>
<td>101</td>
</tr>
<tr>
<td>AMG</td>
<td>1365</td>
<td>355</td>
<td>396</td>
<td>333</td>
<td>281</td>
</tr>
<tr>
<td>Turkish</td>
<td>774</td>
<td>470</td>
<td>98</td>
<td>95</td>
<td>111</td>
</tr>
</tbody>
</table>
Continuation rise examples: Athenian and Turkish

Athenian continuation rise tune: L* H-
(Baltazani & Jun1999; Arvaniti & Baltazani 2005; Baltazani 2006)

Turkish continuation rise tune: H*L H-
(Levi 2002; Göksel & Kerslake 2005; Özge & Bozsahin 2010; Ipek & Jun 2014)

eryaˈzotane “...she was working...”
kıf baʃˈlamadan “Before winter starts”
AMGgen1 examples

Turkish-like [xala'zmenu] ‘broken’

Athenian-like [ta'meri] ‘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 $\lambda$) 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

![Diagram showing data analysis results]
Results 2
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
Thank you
We gratefully acknowledge

• The support of the Economic and Social Research Council (UK), grant ES/R006148/1
• Mark Janse, Dr Petros Karatsareas, Dr Dimitris Papazachariou for generously sharing their data
• Native speaker research assistants Lazaros Kotsanitis and Clio Takas for help with annotation
• Anna Sfakianaki for advice on the pragmatics of the Cretan dialect
• The Lautarchiv of Humboldt University for Turkish data
• The Academy of Athens for their oral corpus data
• The Folklore museum at the University of Athens for their oral corpus data