

# *Dialectometric and acoustic research on Hungarian vowel pronunciation*

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**HUN-REN**  
Hungarian Research Network

Acoustic and dialectometric study of Hungarian dialects, NKFIH, FK 138396

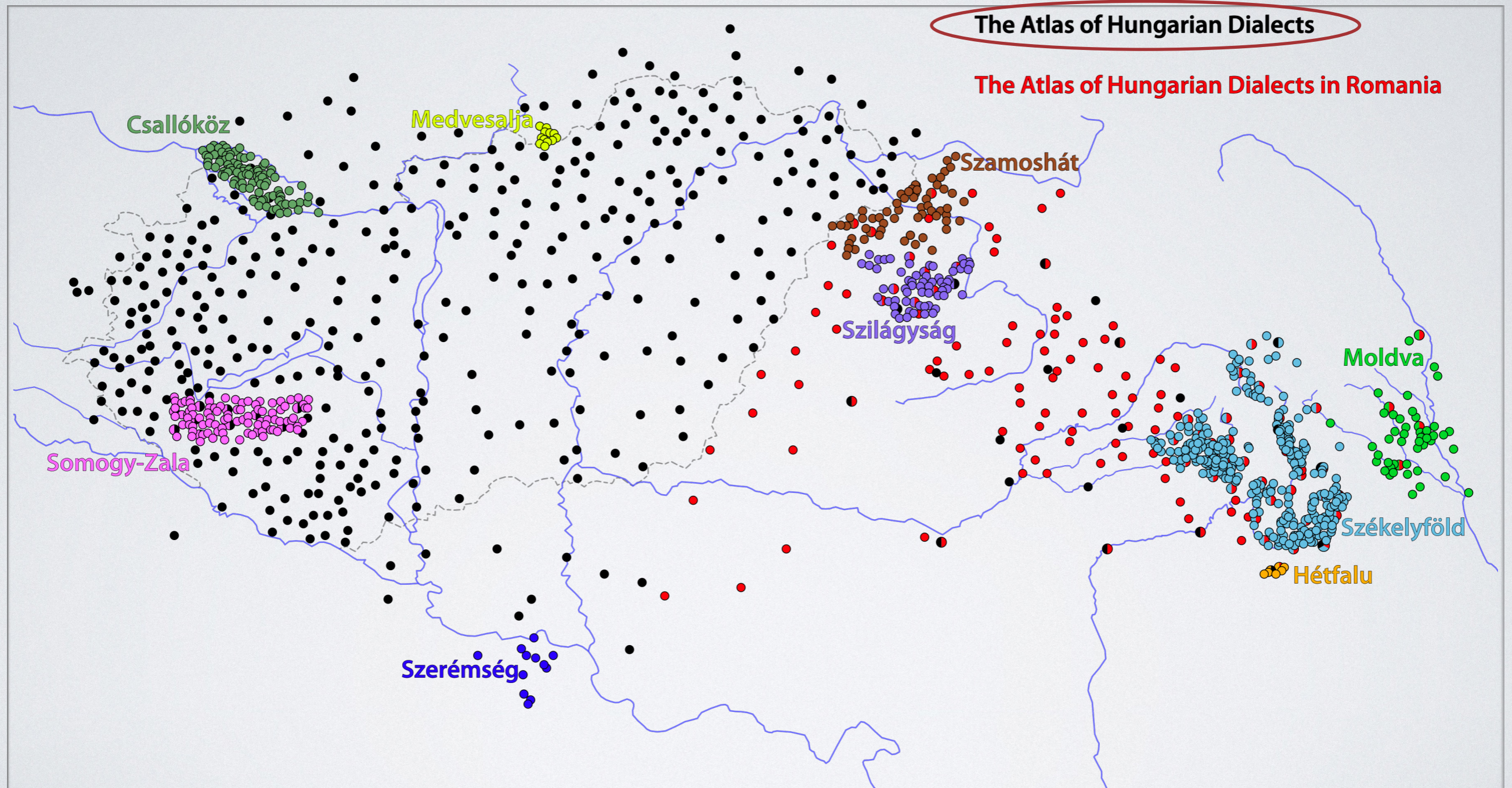


Xth Congress of the International Society for Dialectology and Geolinguistics (SIDG),  
Bucharest 2023

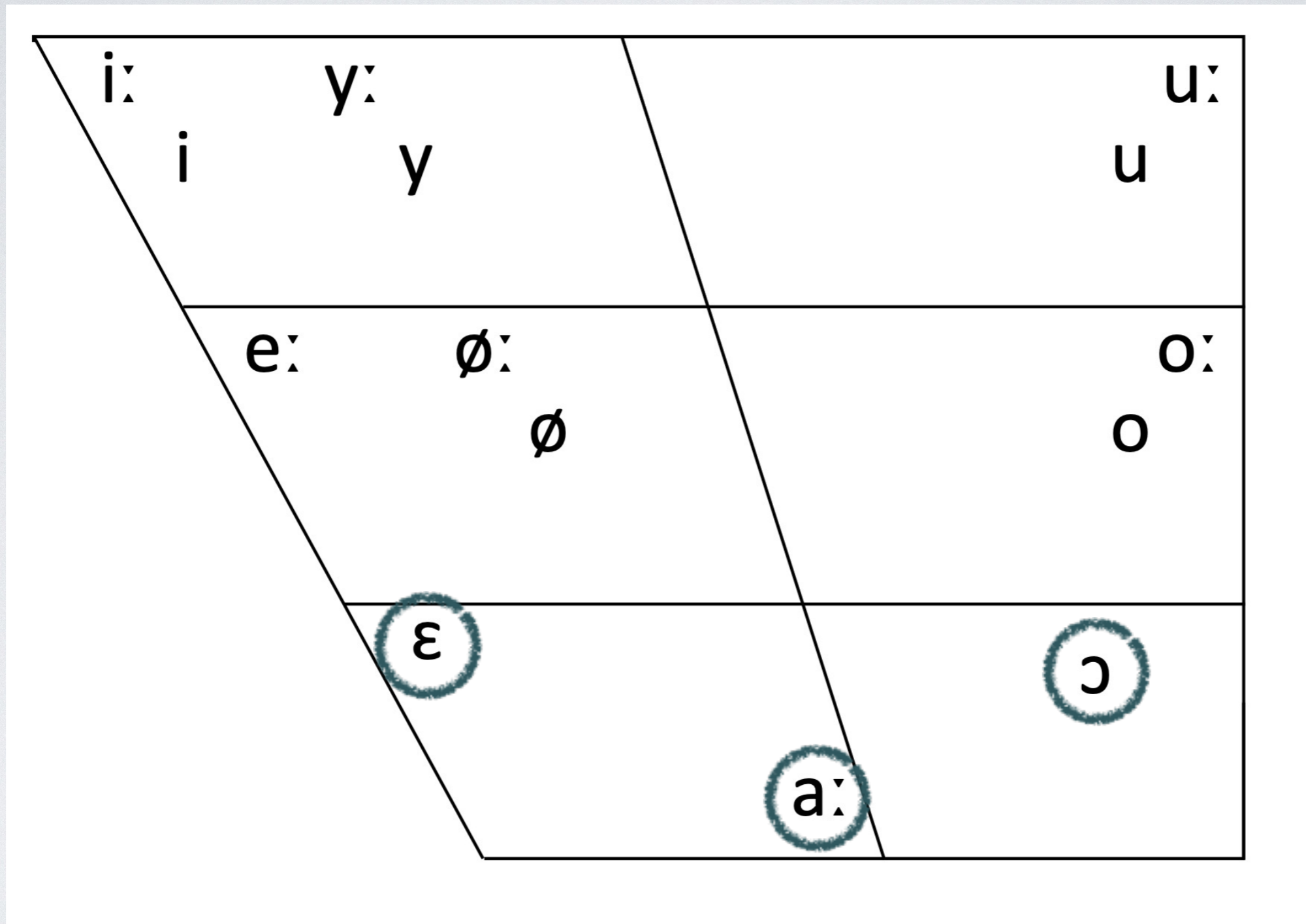
# Structure of the presentation

- The context:
  - Hungarian dialectology, mapping computerised data
- Background of this project:
  - Spatial patterns of Hungarian vowels: mapping vowel pronunciation using estimated F1 values of phonetic symbols
- Dialectometry (Study 1)
- Acoustic measurements (Study 2)
- Conclusion

# Context: Computerized Hungarian dialect atlases



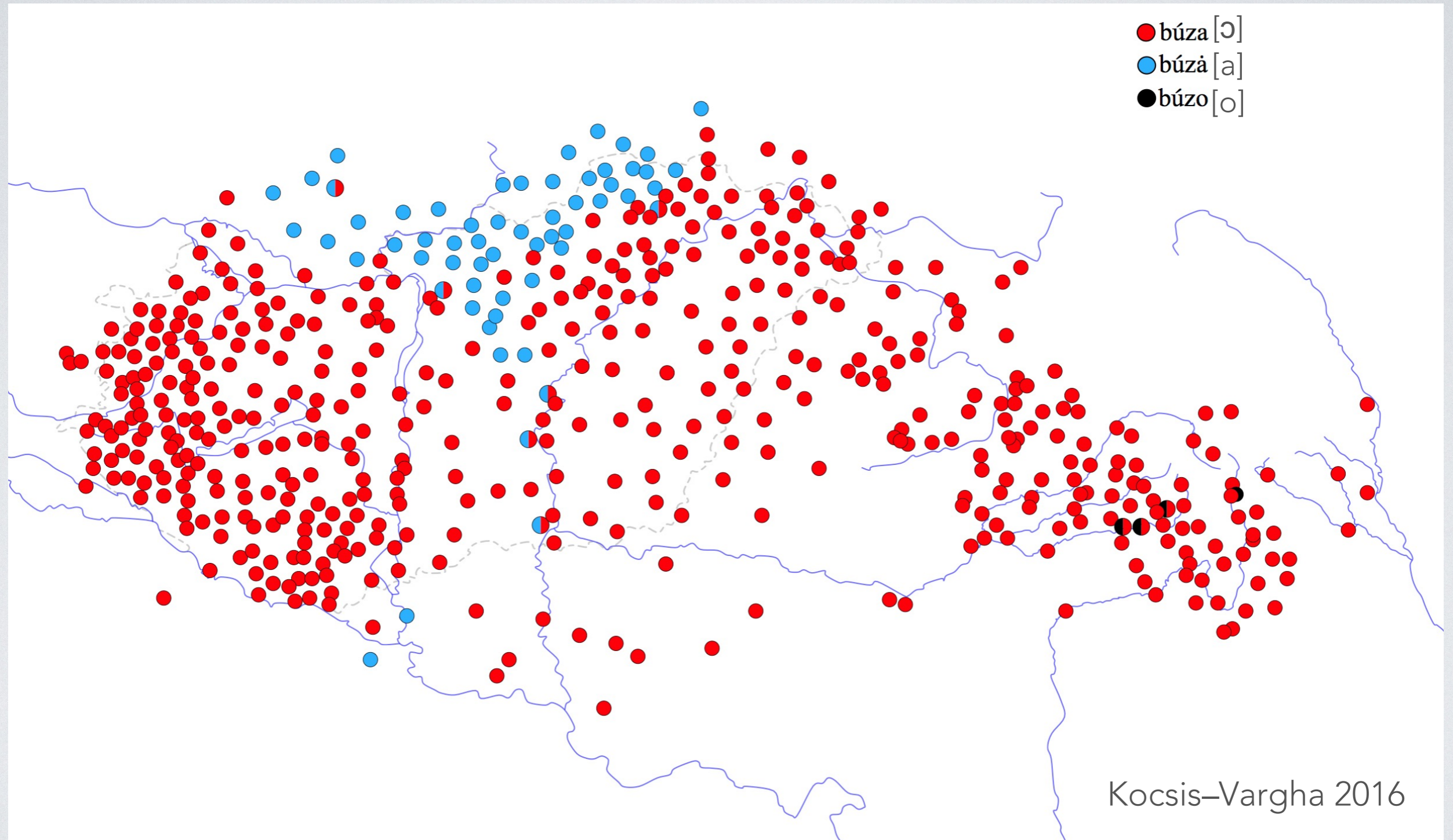
# Context: Standard Hungarian vowels on the IPA chart



Vowel pronunciations in the focus of the present study:

*/ɛ/, /ɔ/, /a:/*

# Context: Mapping computerised dialect data



wheat

The Atlas of Hungarian Dialects  
The Atlas of Hungarian Dialects in Romania

# Research questions

- What are the spatial patterns of Hungarian vowel pronunciation?
  - Study 1: How vocalism and consonantism determine the spatial variation of Hungarian dialects? (Dialectometry)
  - Study 2: What types of vowel systems can be identified in Hungarian? (Acoustic analysis)

The background of the project:  
Mapping vowel pronunciation from  
transcribed atlas data

# Openness of /ɛ/

Pseudo F1 values computed from transcribed atlas data (Vargha 2020)





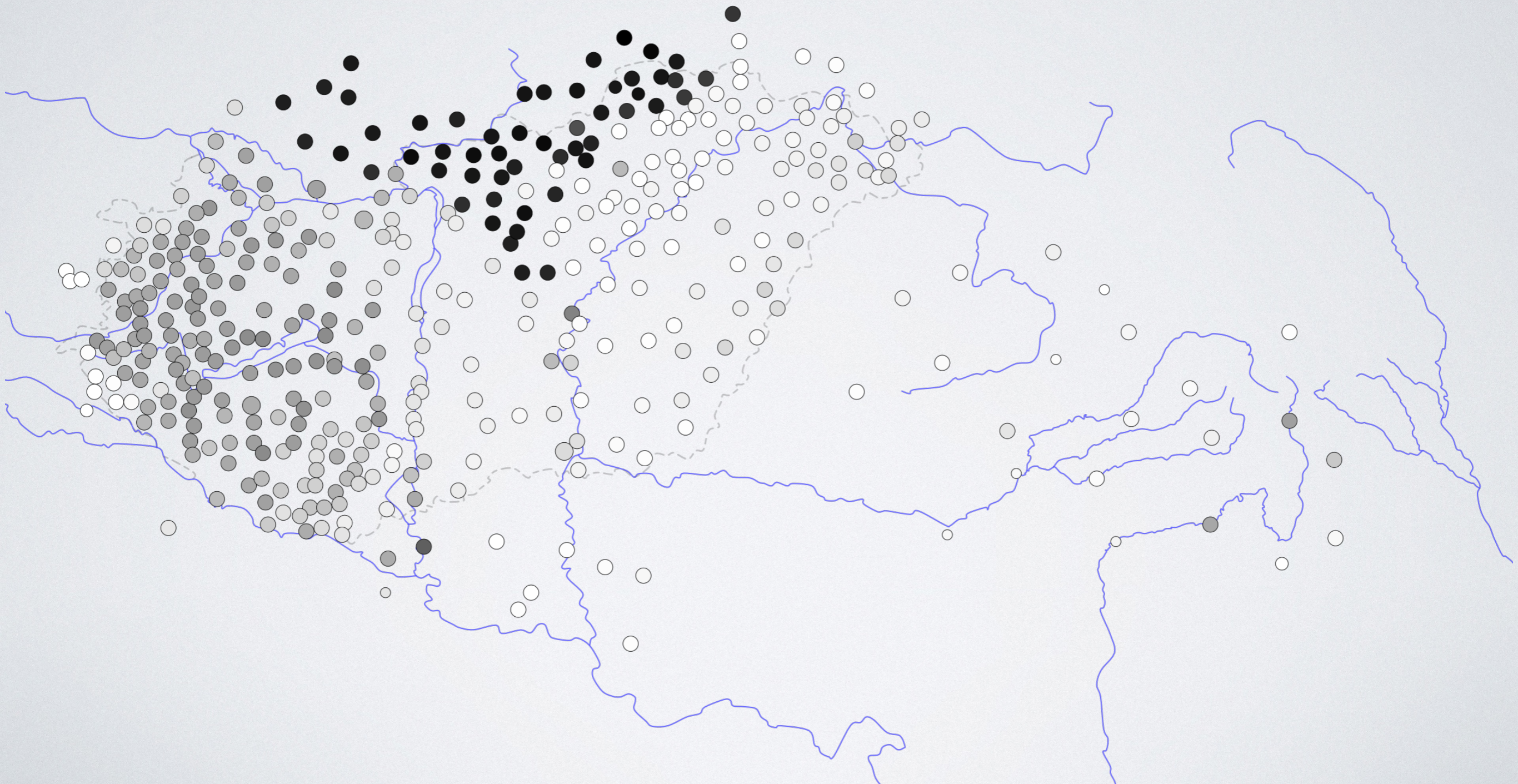
# Openness of /ɔ/

Pseudo F1 values computed from transcribed atlas data (Vargha 2020)



# Openness of /a:/'

Pseudo F1 values computed from transcribed atlas data (Vargha 2020)



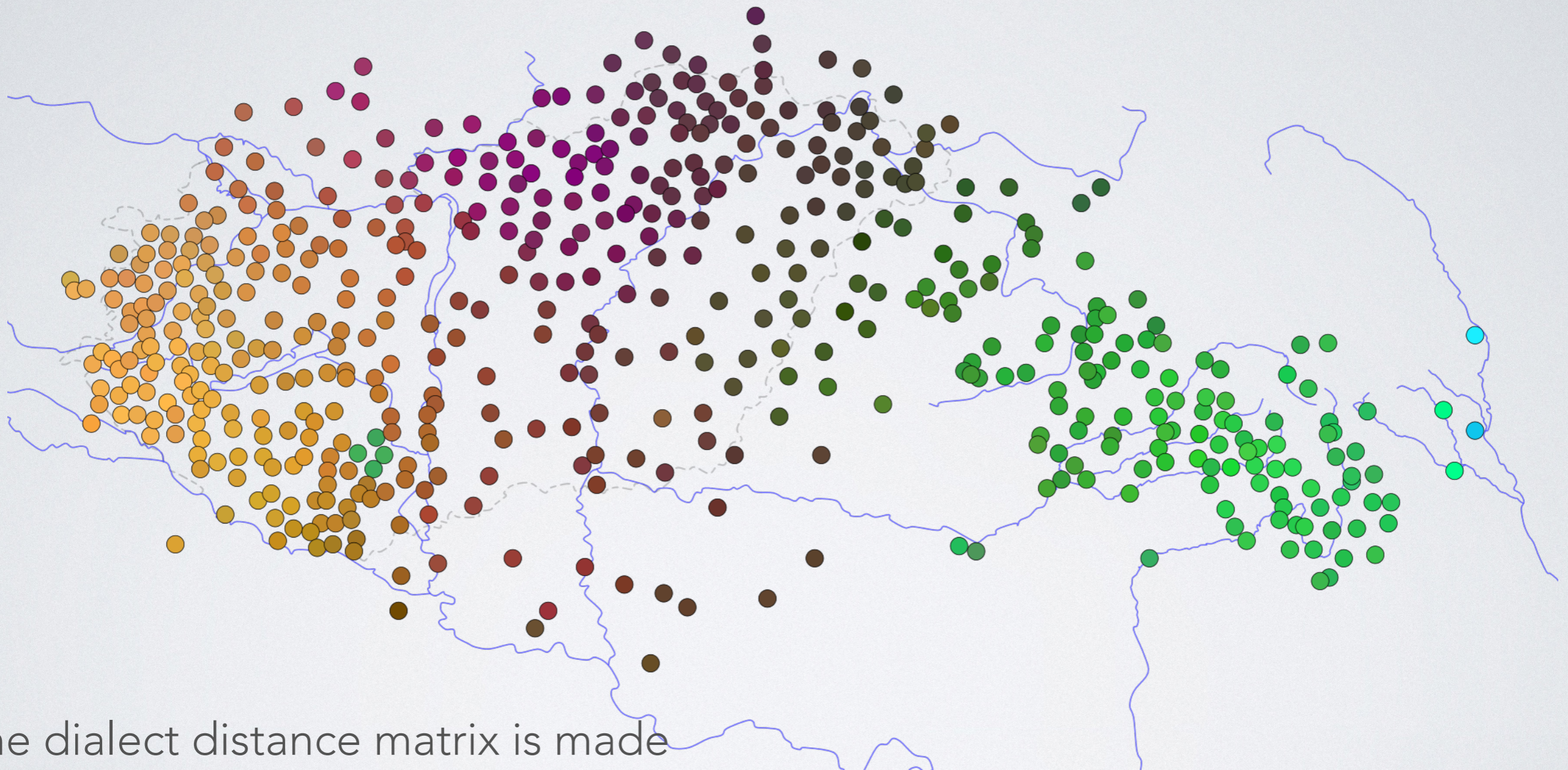
# Study 1: Dialectometry

RQ: How vocalism and consonantism determine the spatial pattern of Hungarian dialects?

# Dialectometric analysis of consonantism and vocalism

- 483 computerized maps from The Atlas of Hungarian dialects and from The Atlas of Hungarian Dialects in Romania (data collected in the '50s and '60s)
- Levenshtein algorithm -> consonantism and vocalism (Levenshtein 1966, Heeringa 2004, Goebel 2006, Vargha 2022)
- Multidimensional Scaling (MDS) maps

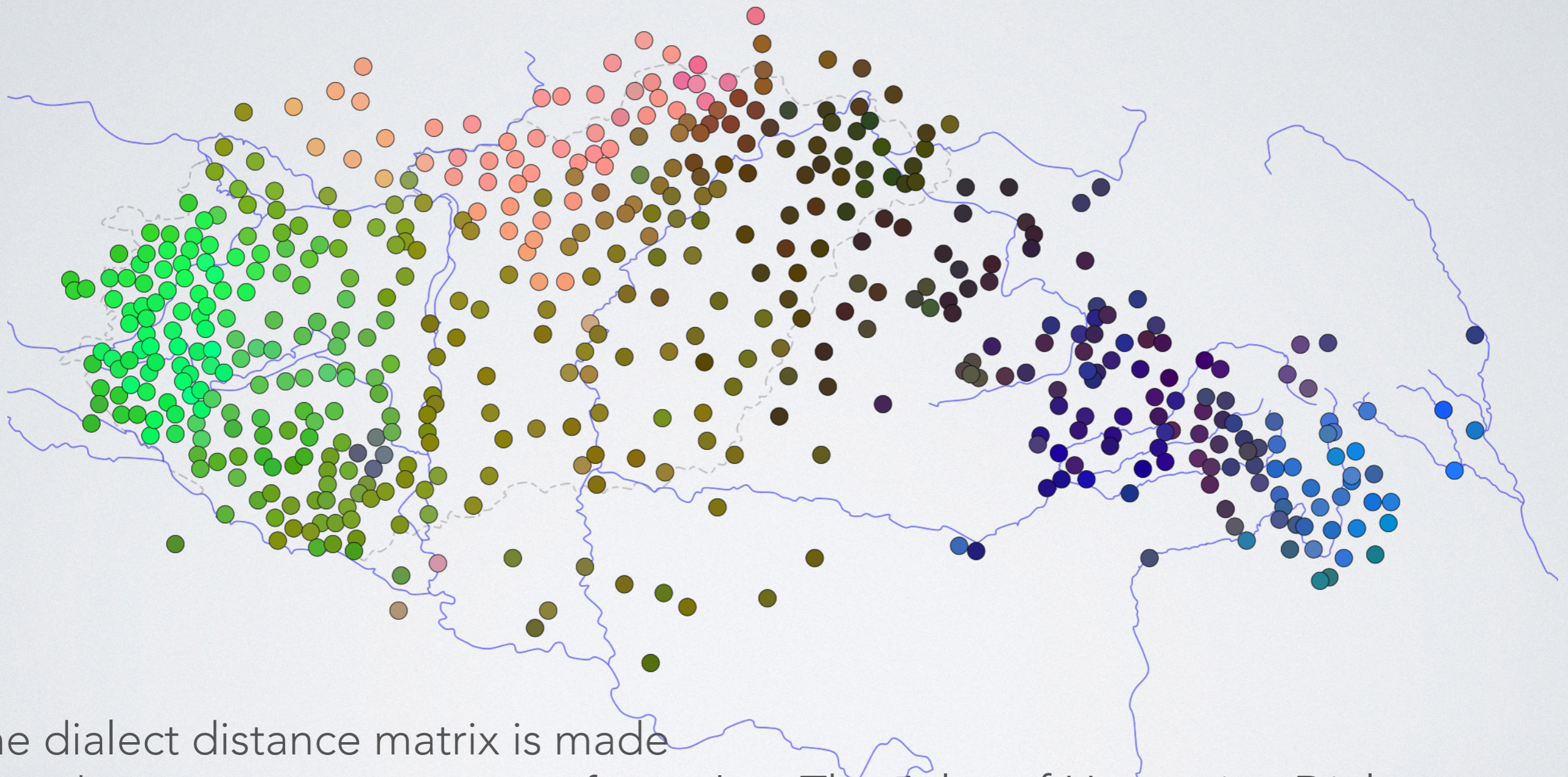
# Dialectometry: MDS map of consonantism



The dialect distance matrix is made from the narrow transcription of vowels. Leveshtein-distance, 483 integrated maps

The Atlas of Hungarian Dialects  
The Atlas of Hungarian Dialects in Romania

# Dialectometry: MDS map of vocalism



The dialect distance matrix is made from the narrow transcription of vowels. Leveshtein-distance, 483 integrated maps

The Atlas of Hungarian Dialects  
The Atlas of Hungarian Dialects in Romania

# Study 2: Acoustic measurements

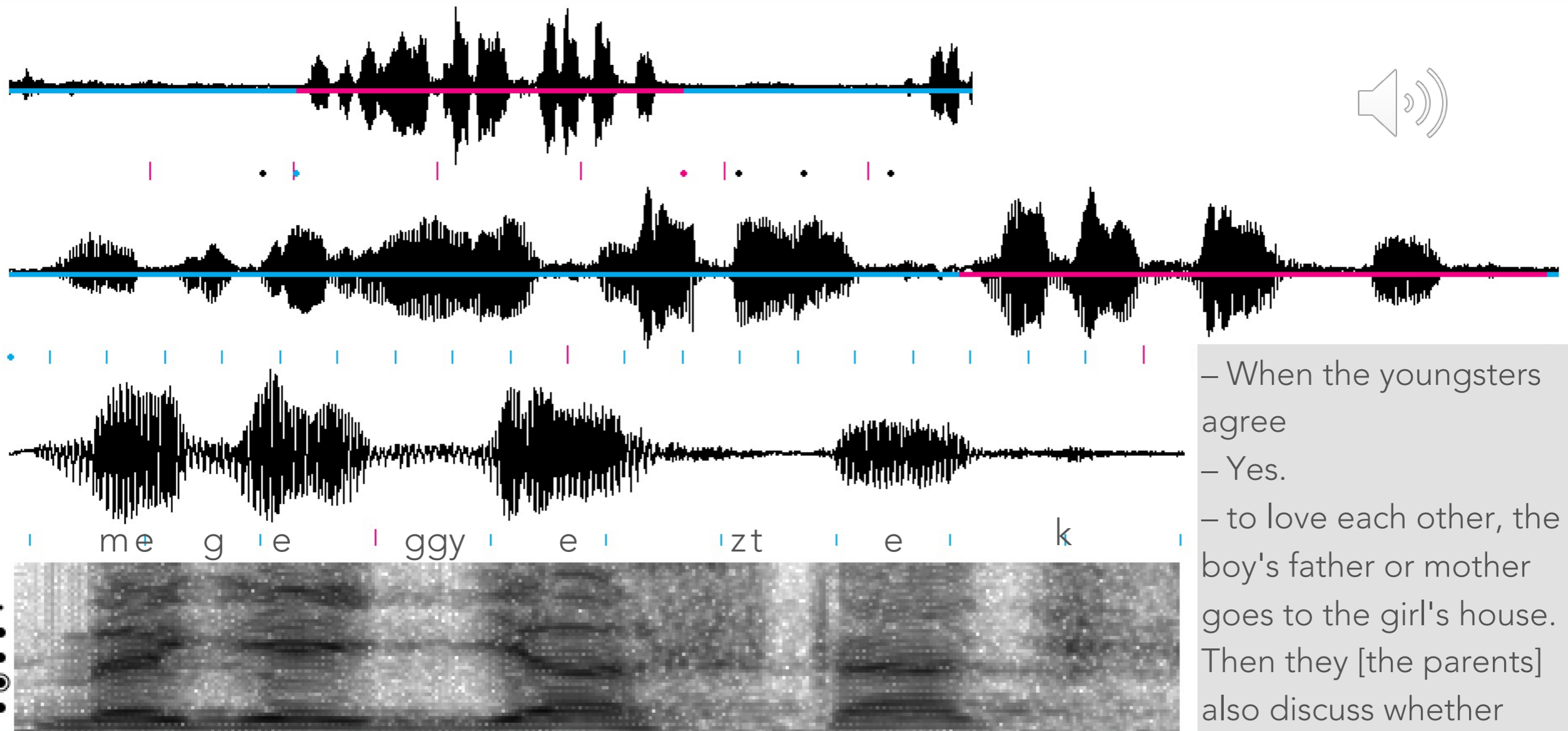
RQ: What types of vowel systems can be identified in Hungarian?

# Method

- Research material: Time-aligned transcriptions of selected interview segments from the recordings (1960–1964, 352 locations, 460 hours) made for The Atlas of Hungarian Dialects
- Interviews transcribed and investigated with a dedicated software for doing Hungarian dialect research (Bihalbocs)
- F1 and F2 measurements with Praat using Burg's method (LPC), manually corrected (if needed)



# Short segment from an interview



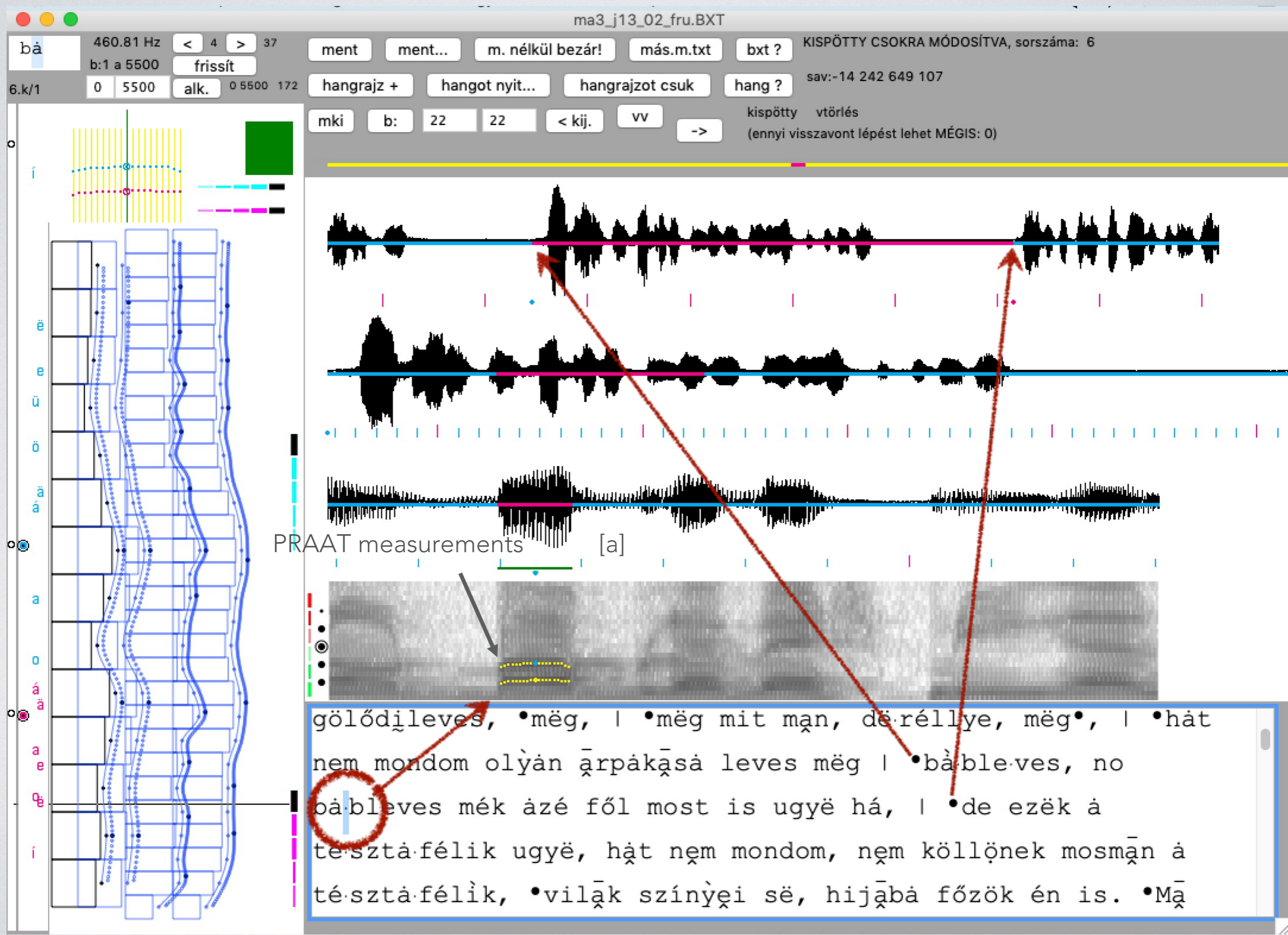
– When the youngsters agree  
– Yes.  
– to love each other, the boy's father or mother goes to the girl's house. Then they [the parents] also discuss whether they will agree to the wedding.

•Hāt mikor m̄an ā fiātálok m̄eḡegyesztek,•

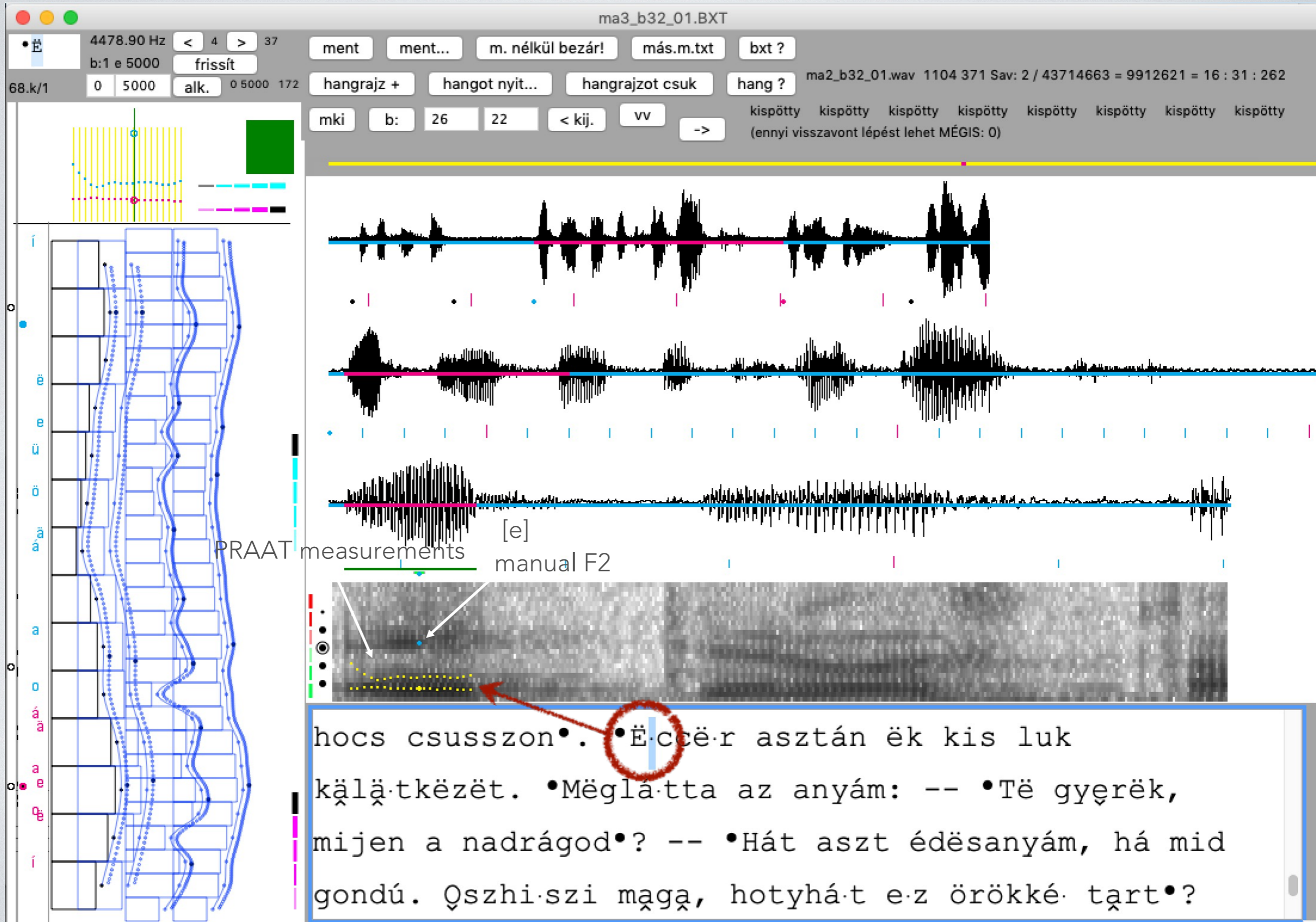
{-1 •Igen. •}

•hoty szeretyik egym̄ast•, •akkor osztā leginnek ā• | •vāgy āz āpjā• |  
vāgy āz ānnya elm̄egy ā lyānhāszo•. •Asztān hāt ōk is m̄öbbszélyik,  
hogy• | •beleēggyeznek-ē ā fiātálok ēggyessígibe•, •helybehāggyák-ē•.

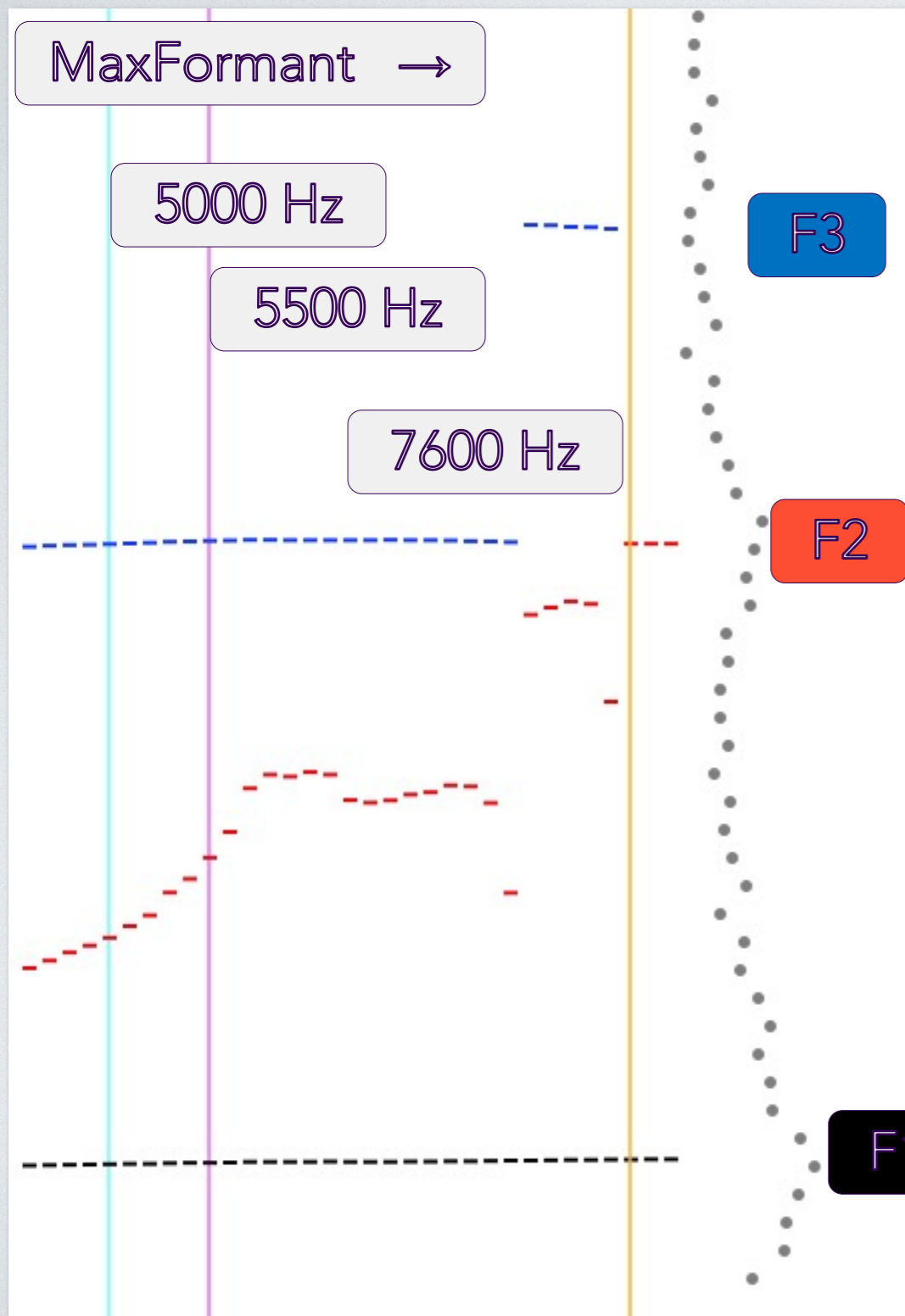
# Measuring F1 and F2 in older dialect recordings 1.



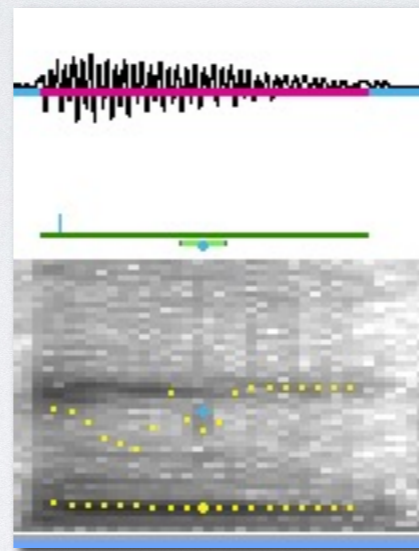
# Measuring F1 and F2 in older dialect recordings 2.



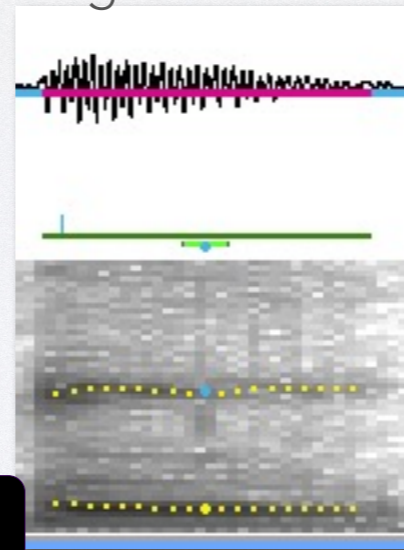
Setting the ideal formant ceiling for each speaker and computing the formant ceiling for each vowel relative to [i:]



kössígházáná

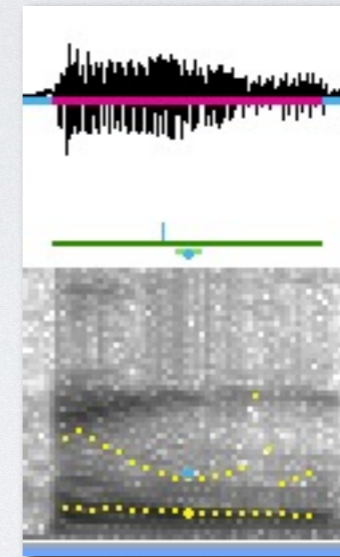


The standard settings of PRAAT

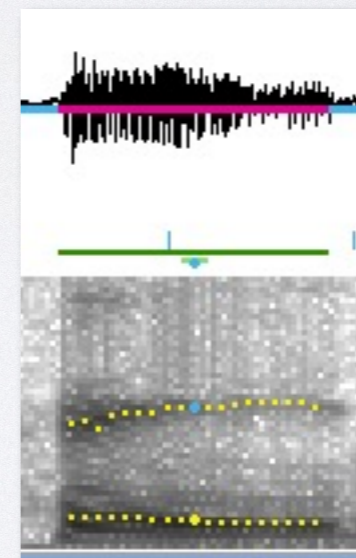


maxFormant\_í:  
7600 Hz

félit

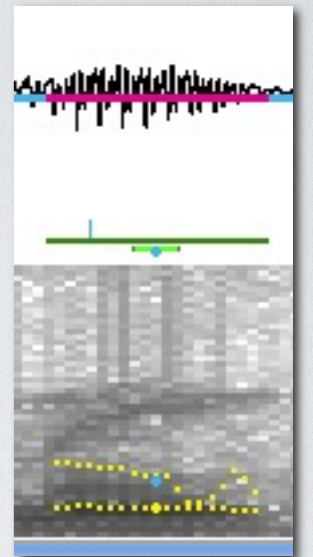


The standard settings of PRAAT

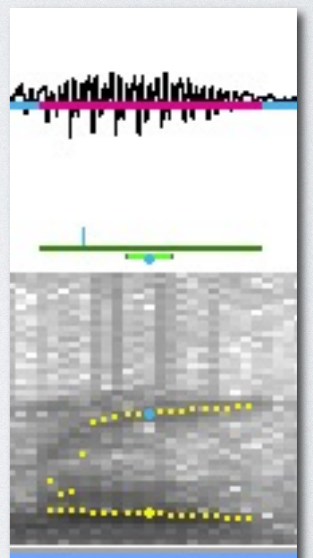


maxFormant\_í:  
7600 Hz

mög

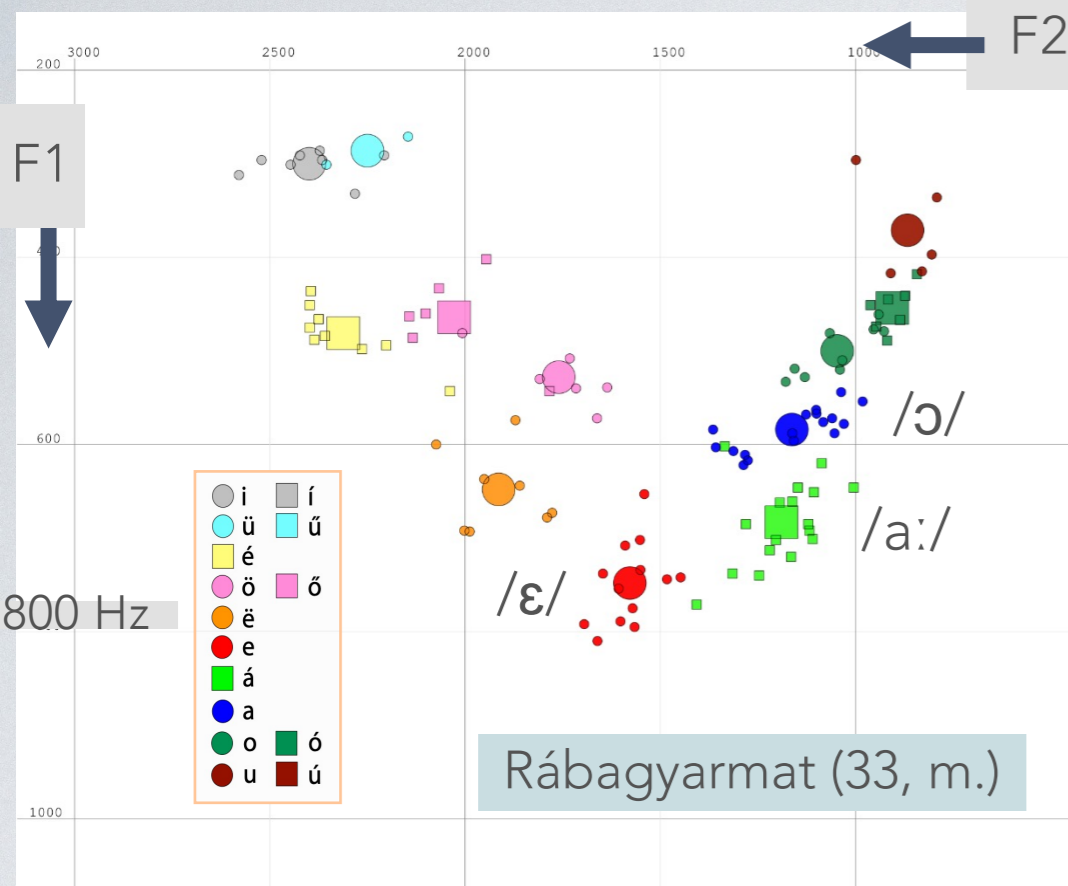


The standard settings of PRAAT

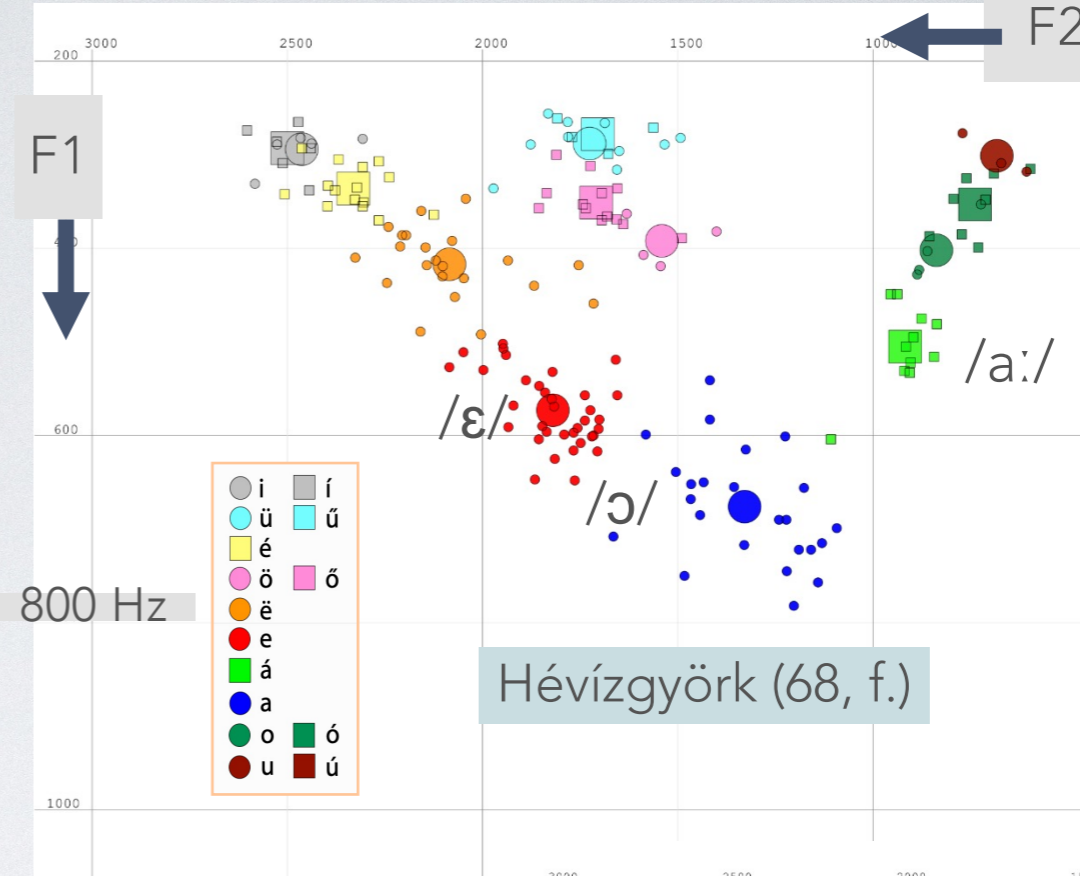


maxFormant\_í:  
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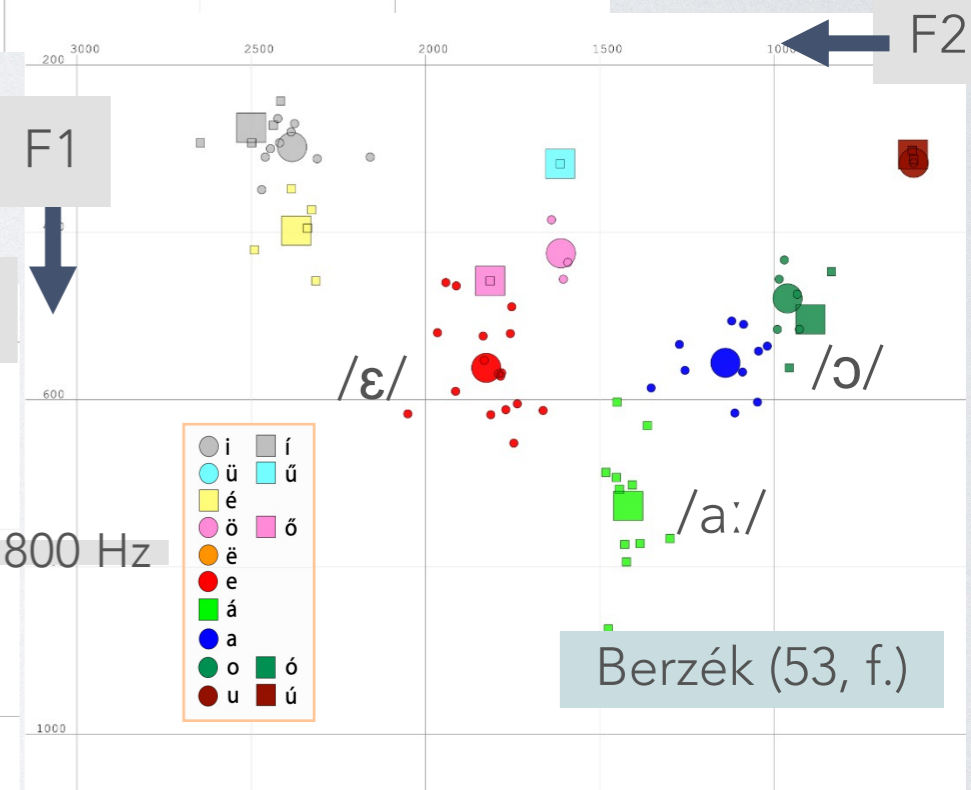
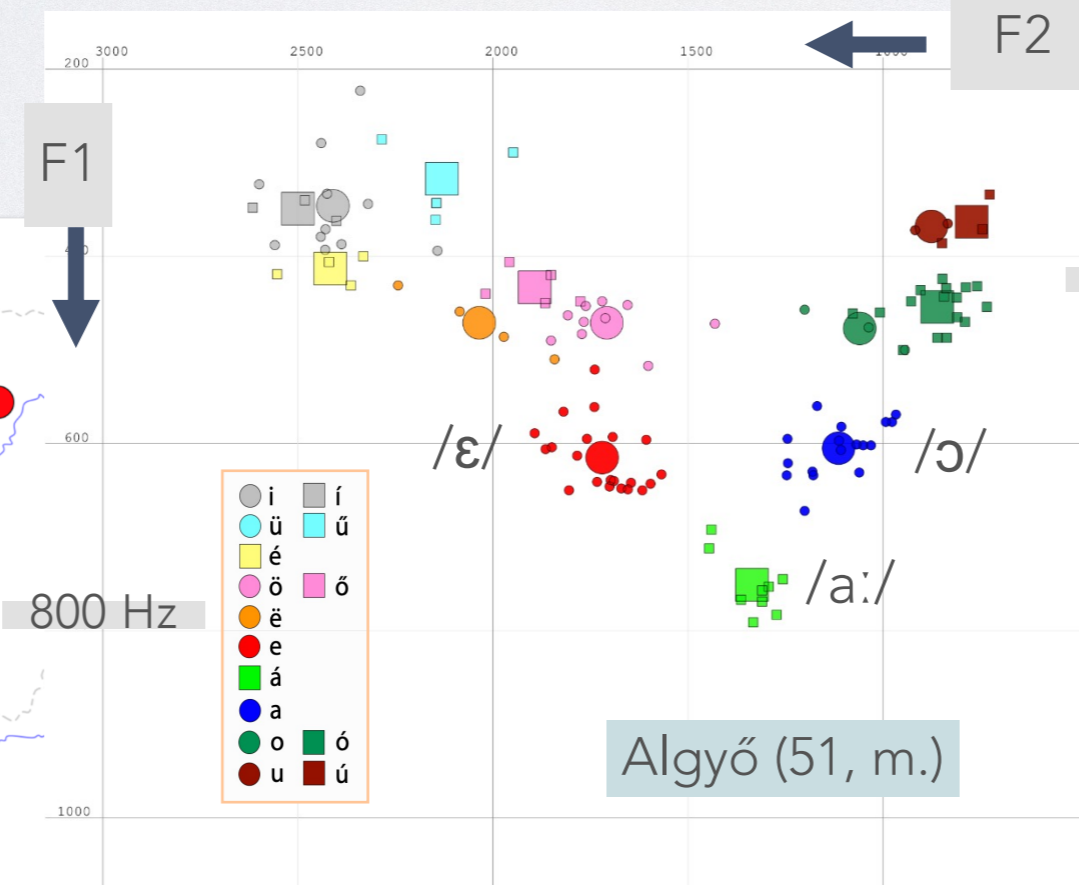
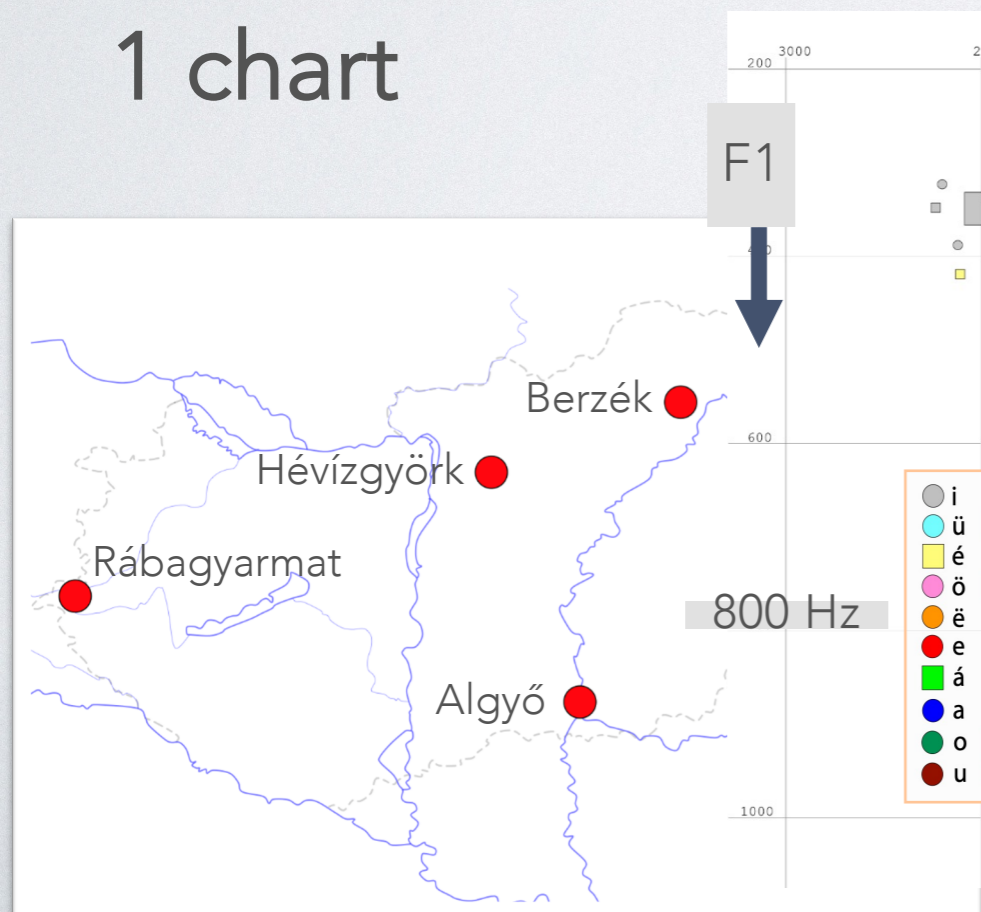
Normalised formant values of 4 speakers with one considerably most open vowel



1 chart



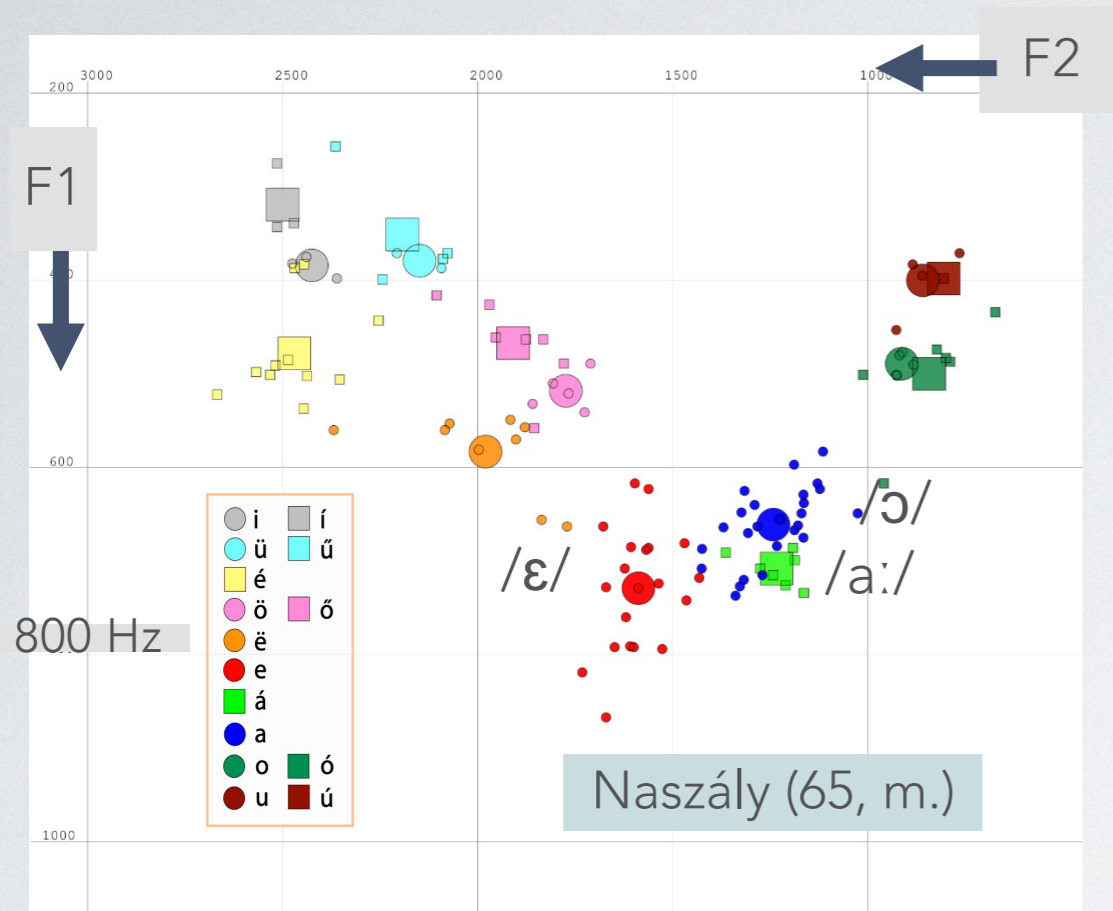
2 chart



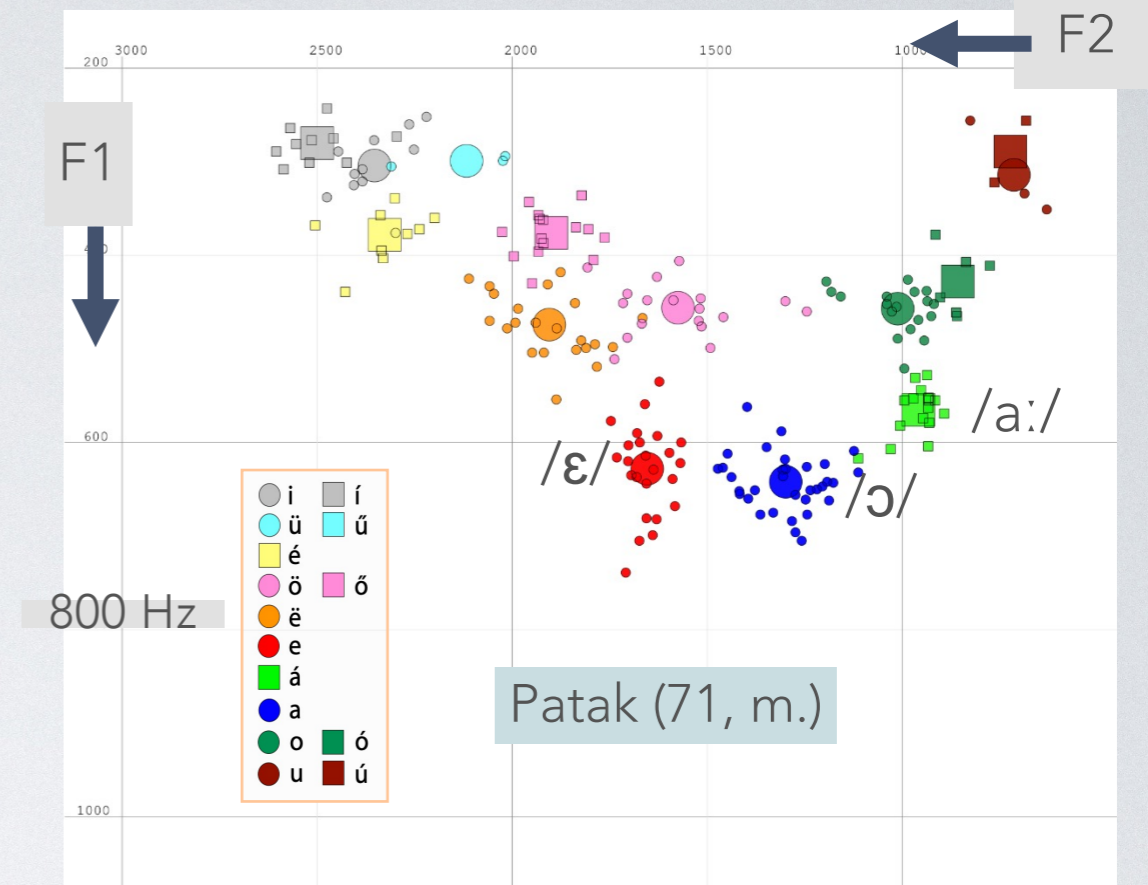
3 chart

4 chart

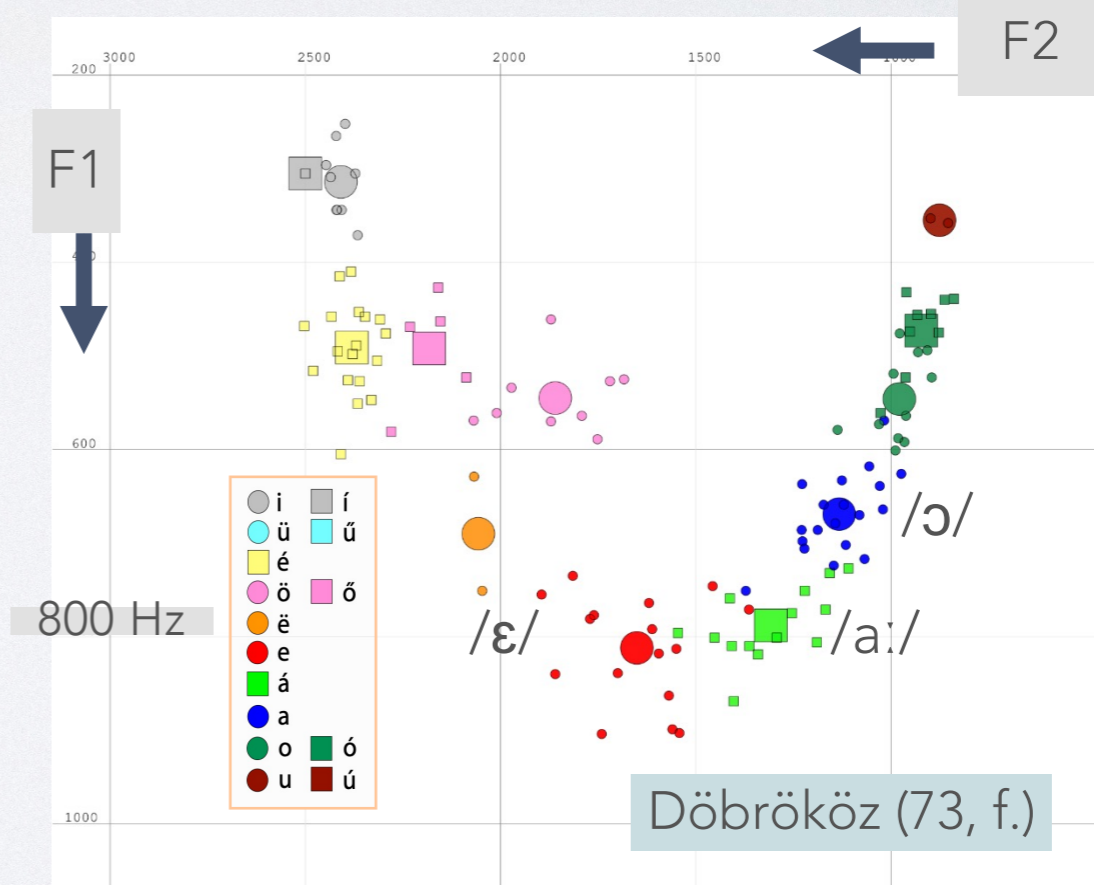
# Normalised formant values of 3 speakers with two similarly most open vowels



1 chart



2 chart

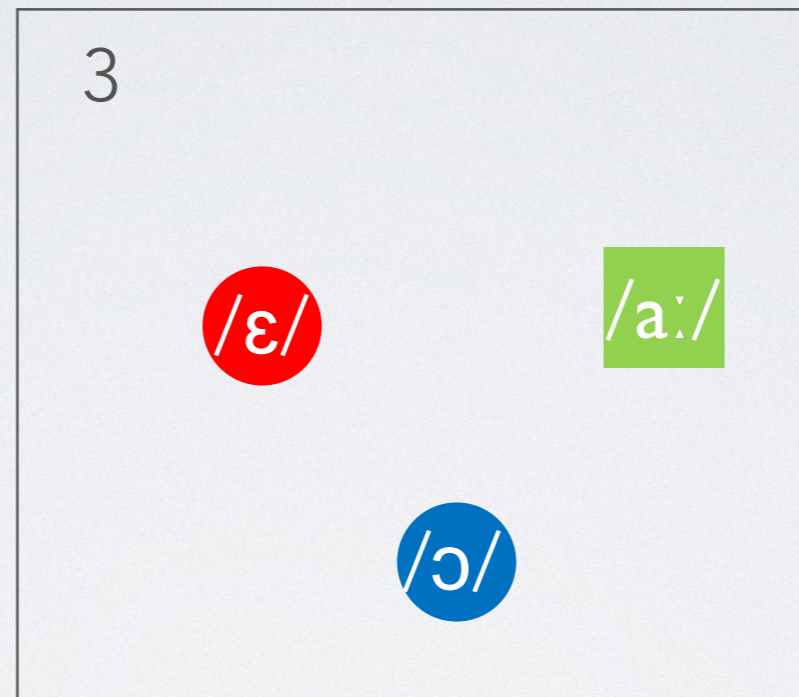
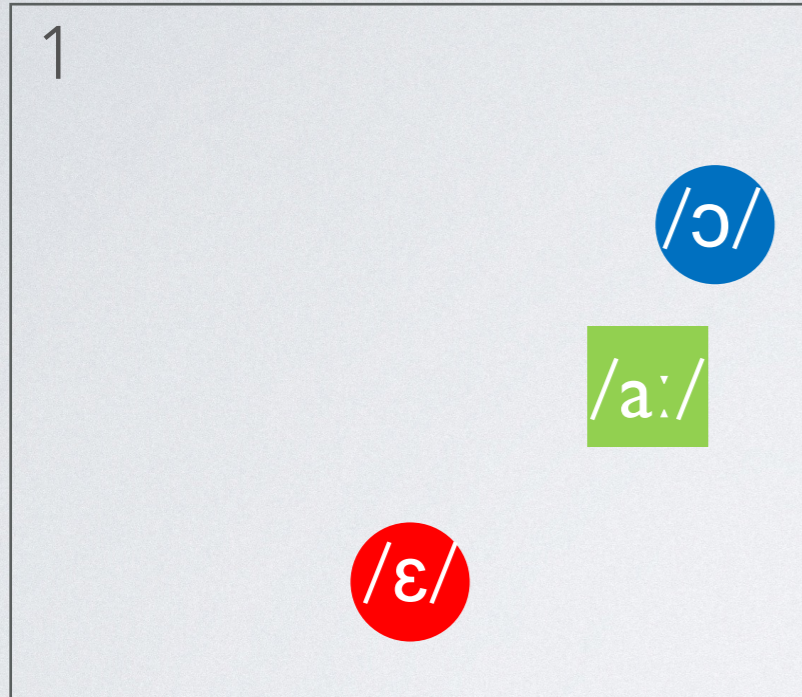


3 chart

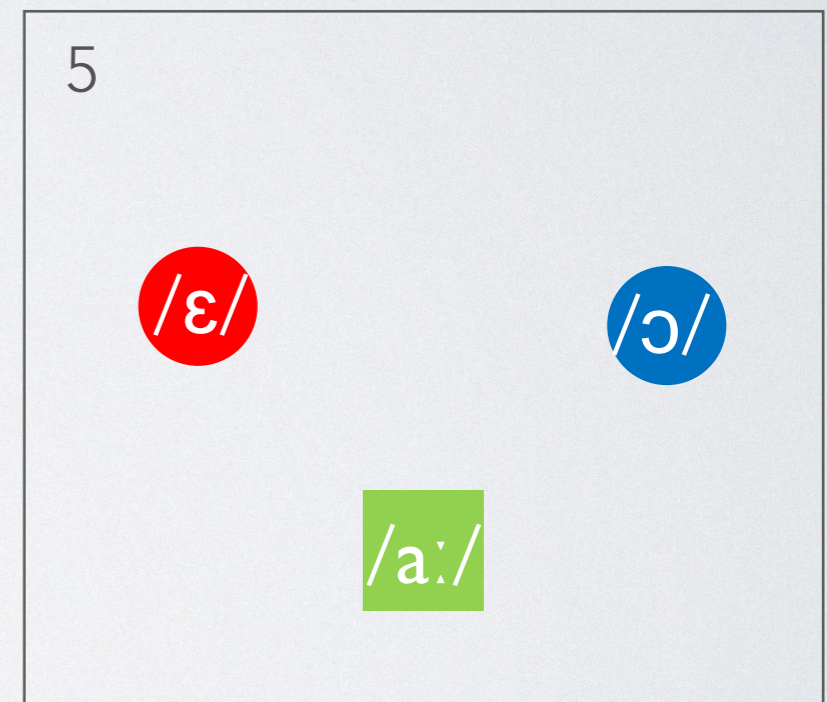
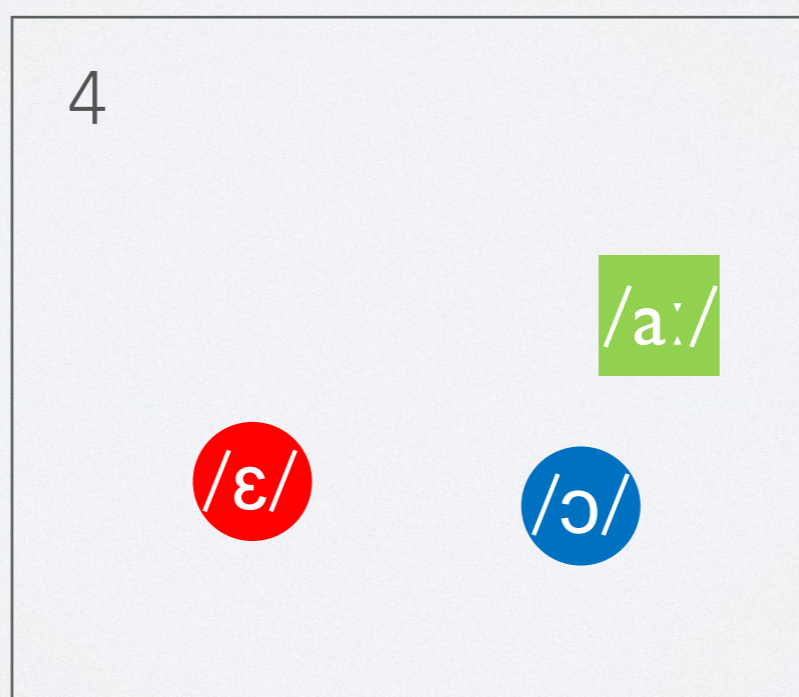
# Different patterns of Hungarian vowel pronunciation: /ɛ/, /ɔ/, /a:/'

Transdanubia

North (Palócföld)



Between the Danube and Tisza rivers and Transtisza



# Conclusion

## Dialectometry (Study 1)

- **Question:** How vocalism and consonantism determine the spatial variation of Hungarian dialects?
- **Result:** spatial patterns of Hungarian dialects are based mainly on vowel pronunciation.

## The acoustic measurements (Study 2)

- **Question:** What types of vowel systems can be identified in Hungarian?
- **Result:** we identified five vowel system patterns based on the pronunciation of the three most frequent Hungarian vowels, /ɛ/, /ɔ/ and /a:/.



Thank you for your attention!

# Bibliography

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