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The role of musical aptitude in the pronunciation of English vowels among Polish learners of English

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About the project

- musical hearing in the acquisition of EFL pronunciation
- 2015 – 2017
- Polish advanced learners of English
- NATIONAL SCIENCE CENTRE POLAND

Background

- music and language evolution (Brown 2001, Mithen 2005)
- music and neurolinguistics (Patel 2008, Fadiga et al. 2009)
- music and L1 acquisition (Carlton 2000, Strait et al. 2012)
- music and L2 acquisition (Pastuszek-Lipińska 2008)
- music in didactics and pedagogy (Franklin et al. 2008)
- popular science

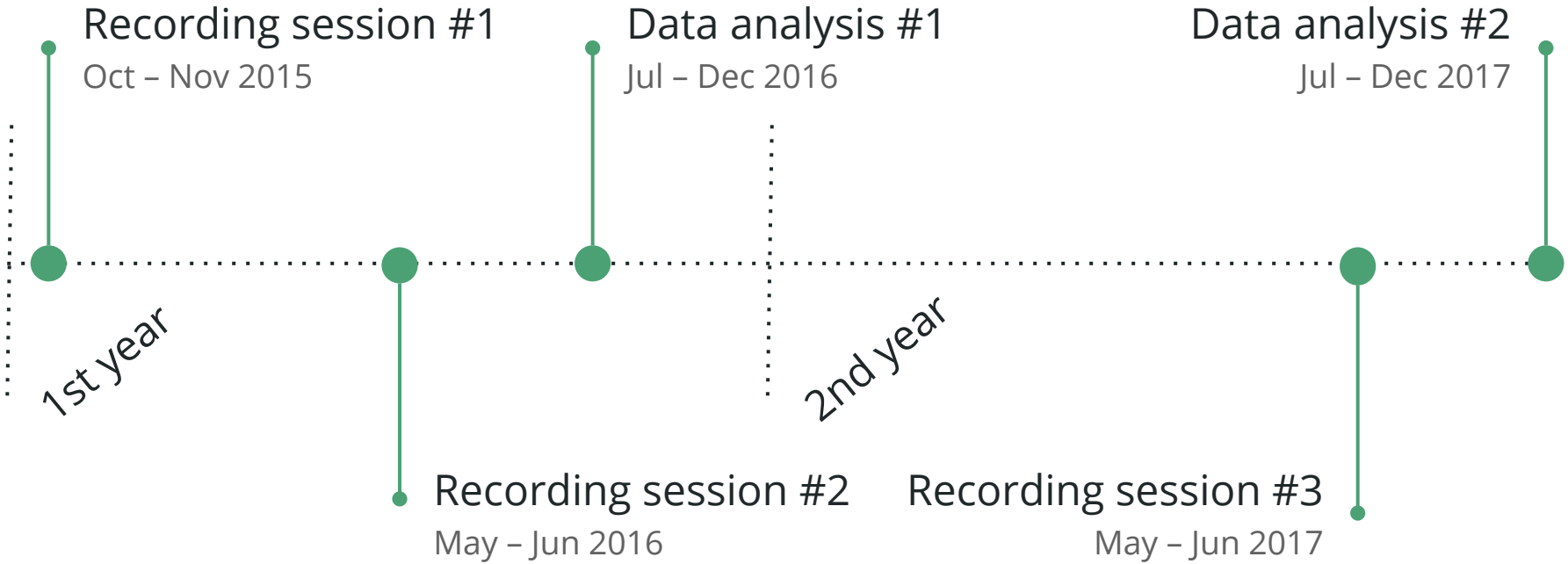
Issues to address

- difficult to measure and define
- difficult to control and assess
- scarcity of empirical data for musical hearing
- scarcity of longitudinal studies
- general language proficiency vs specific aspects of pronunciation
- general musical aptitude vs specific aspects of musical hearing

Research questions

- What is the influence of musical hearing on the acquisition of EFL pronunciation?
- To what extent are pitch perception, melodic memory and musical rhythm correlated with the acquisition of English vowels, intonation and language rhythm?
- To what extent do musical experience and musical education influence the process of second language acquisition?

Project roadmap



Participants

- 80 Polish advanced learners of English
- 1BA English studies programme
- 19-20 years old
- General British model
- intensive two-year pronunciation course
- extensive one-year phonetics and phonology course

Recording sessions

- Polish spontaneous speech (casual conversation)
- Polish wordlist (six vowels in different consonantal contexts)
- English spontaneous speech (casual conversation)
- English reading passage (*Please Call Stella*)
- English dialogues (four dialogues with different intonation patterns)
- English wordlist (ten vowels in different consonantal contexts)

Musical tests (Mandell 2009)

- pitch perception ~ vowel production
- melodic memory ~ intonation
- musical rhythm ~ language rhythm

Vowel measurements

- sample: 100 tokens per vowel (h_d context) in 20 speakers
- Praat (Boersma and Weenink 2015)
- forced-alignment method | NORM | *Vowels* in R (Tyler and Kendall 2015)
- all vowels plotted (10 English monophthongs)
- participants' formant values vs GB model formant values (Cruttenden 2014)
- pitch perception test vs Euclidean distance

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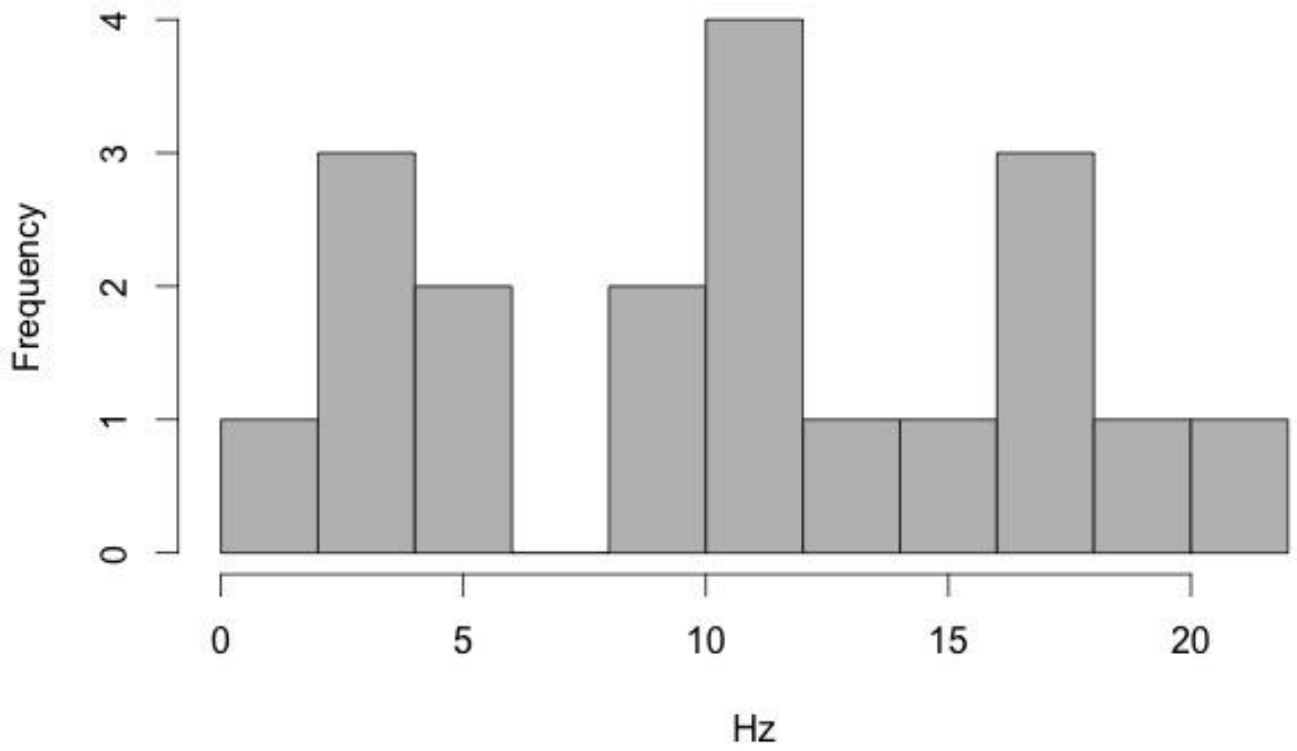
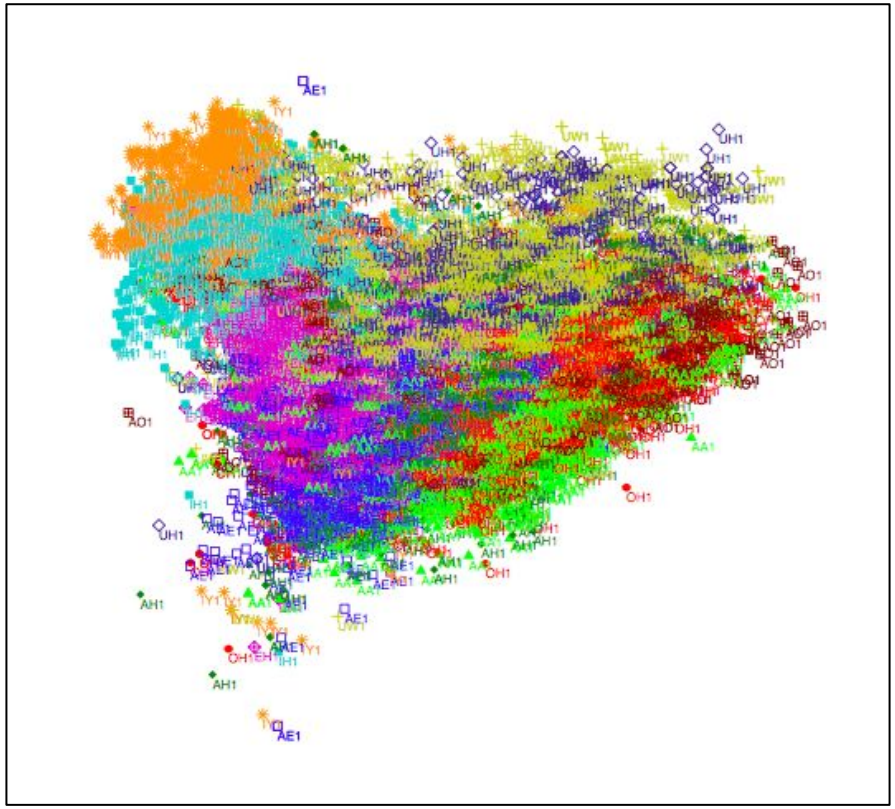
Results

Pitch perception test

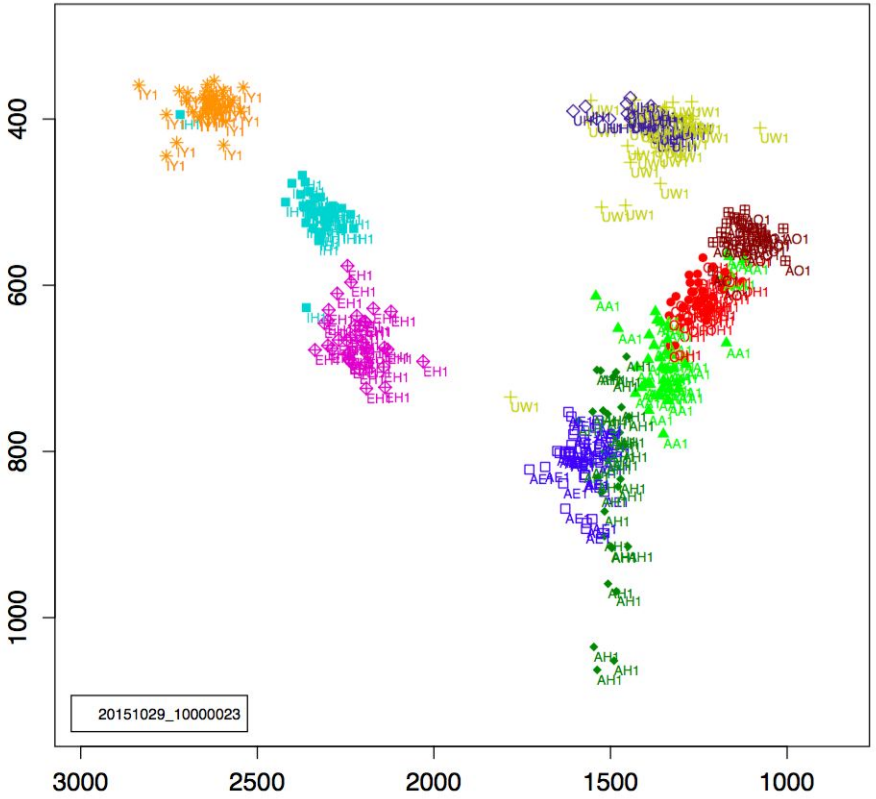


Results All vowels (Bark difference normalized)



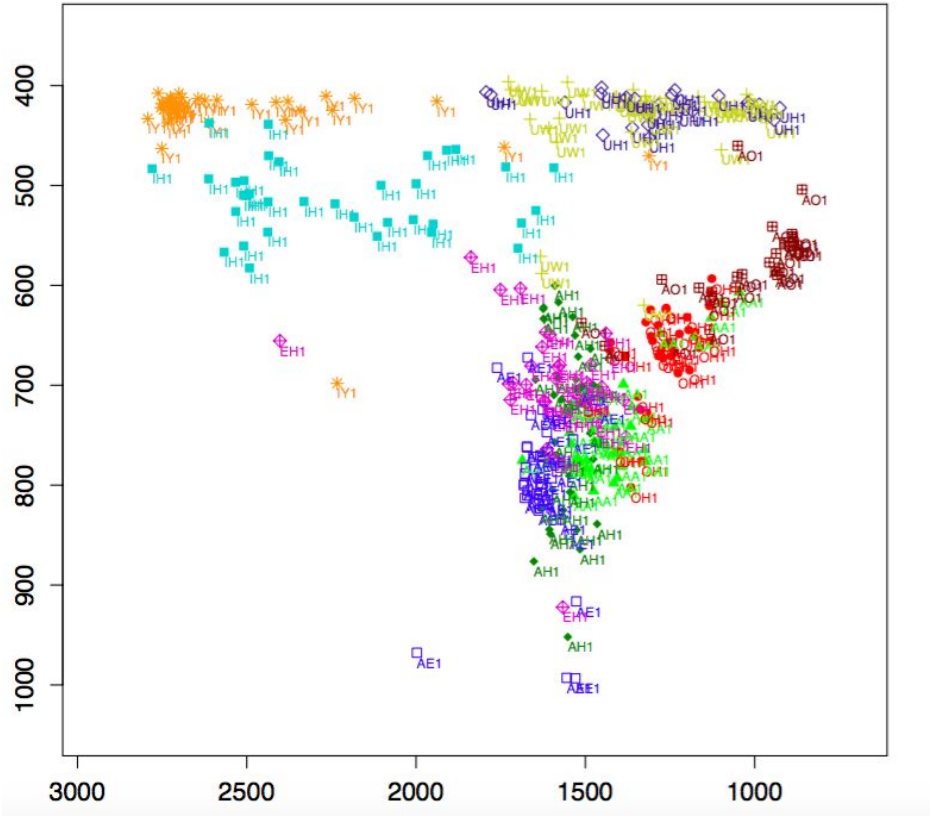
Results

P045 (female, adaptive pitch test result: **3 Hz**)



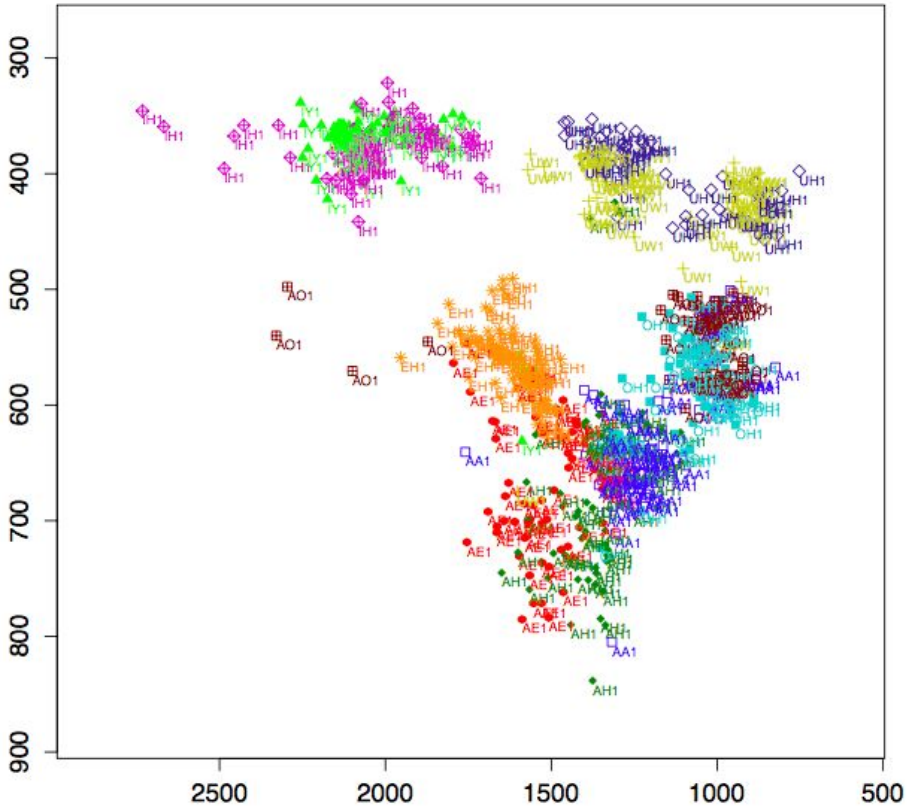
Results

P041 (female, adaptive pitch test result: **19.2 Hz**)



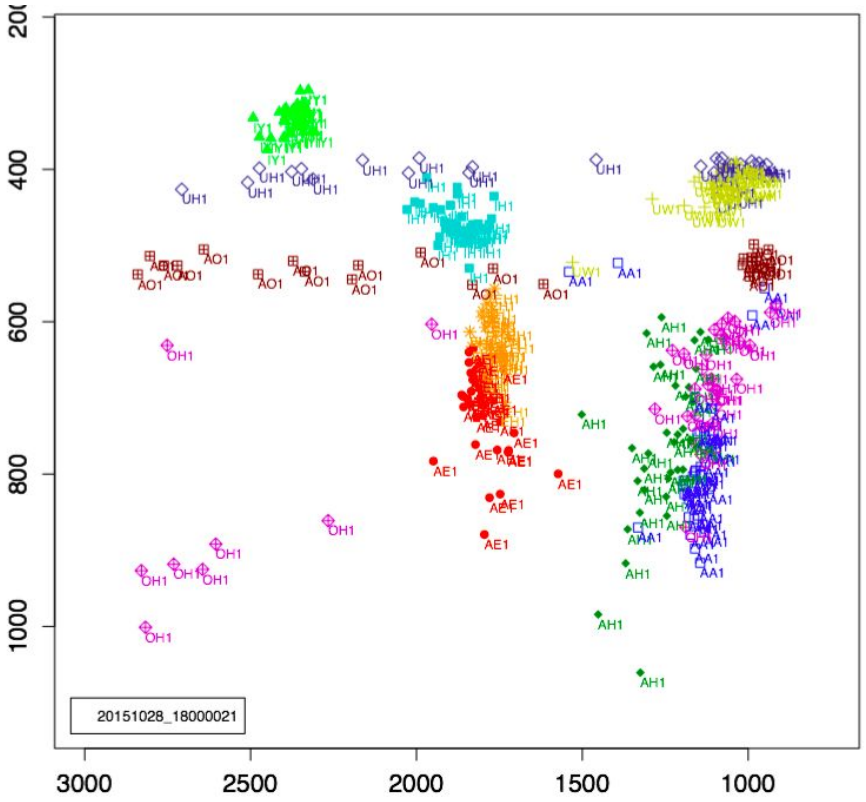
Results

P037 (male, adaptive pitch test result: **1.8 Hz**)



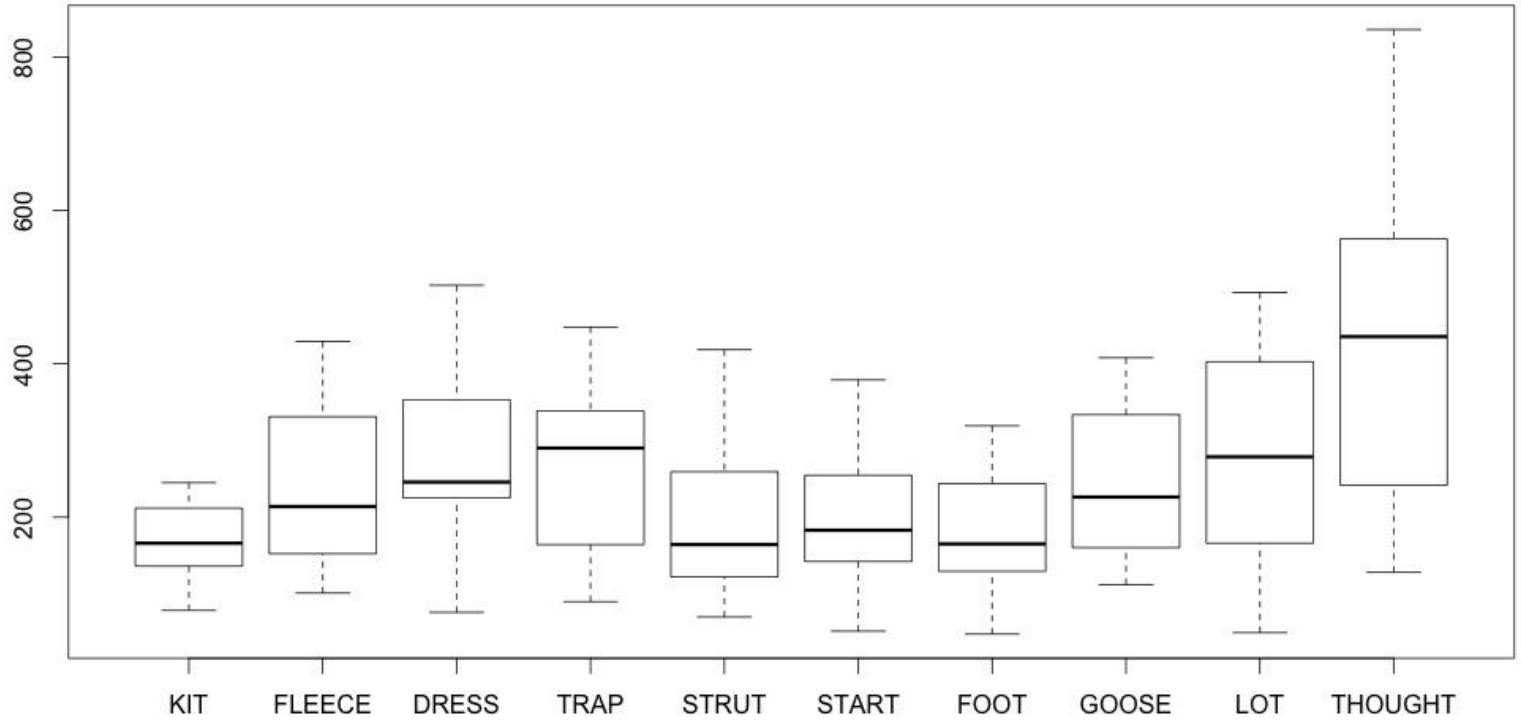
Results

P043 (male, adaptive pitch test result: **20.4 Hz**)



Results

Euclidean distances



Results

pitch perception test ~ Euclidean distance

Vowel	R	P-Value
KIT	0.2056	0.045
FLEECE	0.1963	0.711
DRESS	0.2456	0.010
TRAP	0.0002	0.879
STRUT	0.1686	0.102
START	0.0003	0.997
FOOT	0.128	0.213
GOOSE	-0.230	0.024
LOT	-0.152	0.141
THOUGHT	0.010	0.918

Conclusions

- mixed effect for **pitch perception ~ production of EFL vowels**
- KIT and DRESS most stable in production
- THOUGHT most prone to variation
- GOOSE and LOT stand out
- good pitch perception can be helpful in acquisition of certain vowels
- other factors as important in the acquisition of EFL vowels

To be continued...

- look more carefully into individual speakers
- analyse vowels in other consonantal contexts
- compare with the next two recording sessions
- check for other possible factors:
    - musical experience
    - language exposure
    - stress level

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