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Contours in music and speech

the effect of musical aptitude on speech prosody

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About the project

- musical hearing in the acquisition of EFL pronunciation
- 2015 – 2018
- 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
- 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

- To what extent are **pitch perception**, **melodic memory** and **rhythmic perception** correlated with the acquisition of EFL intonation?
- To what extent are EFL learners able to imitate their teachers' pronunciation?
- Is EFL intonation learnable / teachable?

Participants

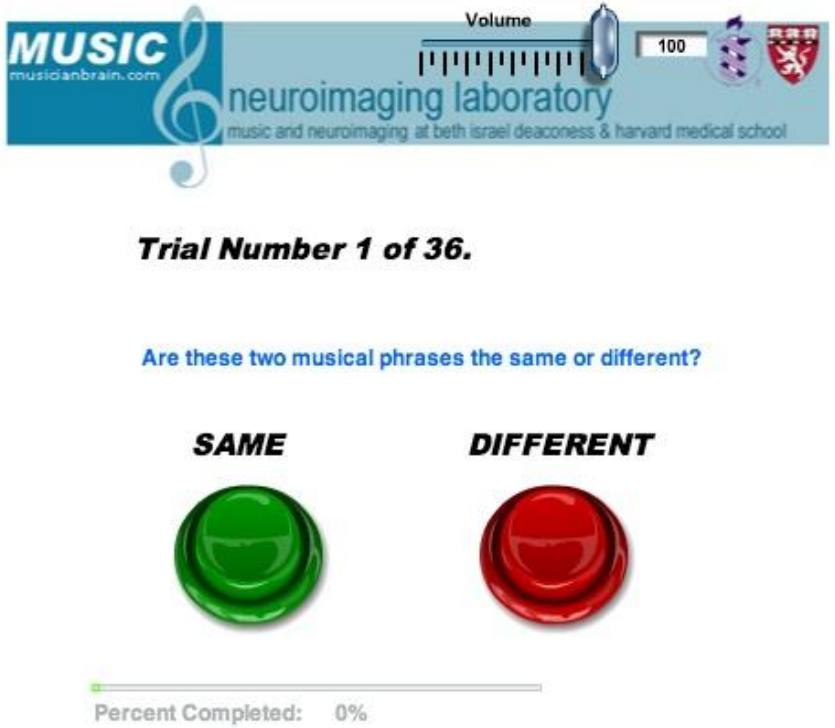
- 20 Polish advanced learners of English (all female)
- BA English studies programme
- 19-21 years old
- General British pronunciation model
- intensive two-year accent training
- one-year phonetics and phonology course

Recording sessions

- before and after accent training
- c. 50 minutes
- spontaneous speech (warm-up)
- reading passage (*Please Call Stella*)
- dialogues (four dialogues eliciting intonation)
- wordlist (sets of words eliciting GB vowels)

Musical hearing tests (Mandell 2009)

- pitch perception (Hz)
- melodic memory (%)
- rhythmic perception (%)



Online survey

- musical experience
  - music school
  - private music tutoring
  - playing a musical instrument
  - playing in a band
  - singing

The dialogue

A: What are you drinking?

B: Coffee.

A: Neat! Let me have some.

B: Hands off my drink!

A: I only want to tase it...

B: You’re broke again, aren’t you?

A: Don’t worry, I’ll have some money soon.

B: In that case, here you go.

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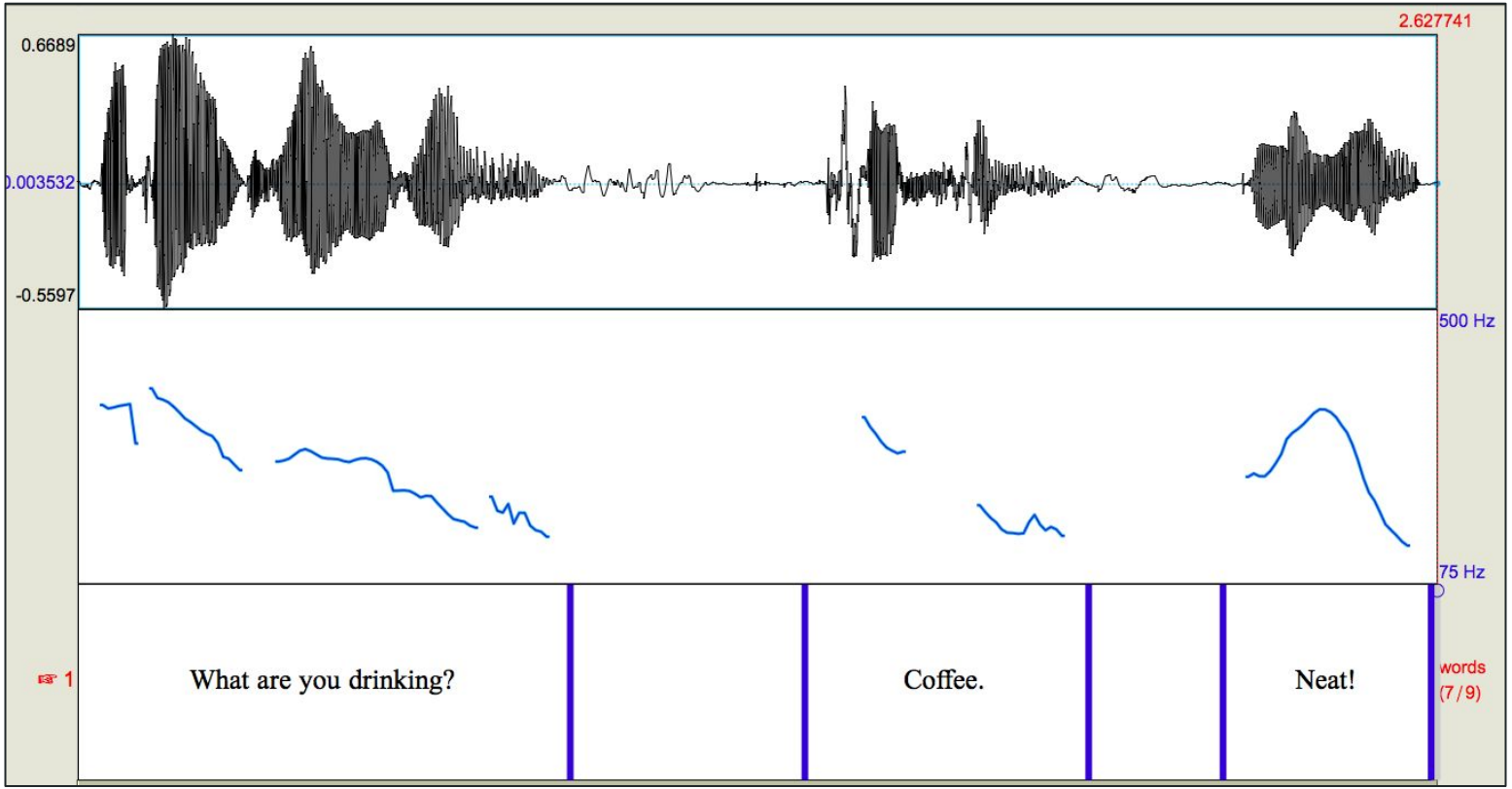
Acoustic analysis (3 teachers & 1 native speaker)



Acoustic analysis

Speaker	What are you drinking?	Coffee.	Neat!	Let me have some.	Hands off my drink!	I only want to taste it...	You're broke again,	aren't you?	Don't worry,	I'll have some money soon.	In that case,	here you go.
T1	fall	fall	rise-fall	fall	fall	rise	fall	fall	rise	fall	rise	fall
T2	fall	fall	rise-fall	fall	fall	rise	fall	fall	rise	fall-rise	fall	fall
T3	fall	fall	rise-fall	fall	fall	rise	fall	fall	fall-rise	fall	rise	fall
NS	fall	fall	rise-fall	fall	fall	rise	fall	fall	fall-rise	fall-rise	fall	fall

The dialogue

A: What are you drinking? **(fall)**

B: Coffee. **(fall)**

A: Neat! **(rise-fall)** Let me have some. **(fall)**

B: Hands off my drink! **(fall)**

A: I only want to tase it… **(rise)**

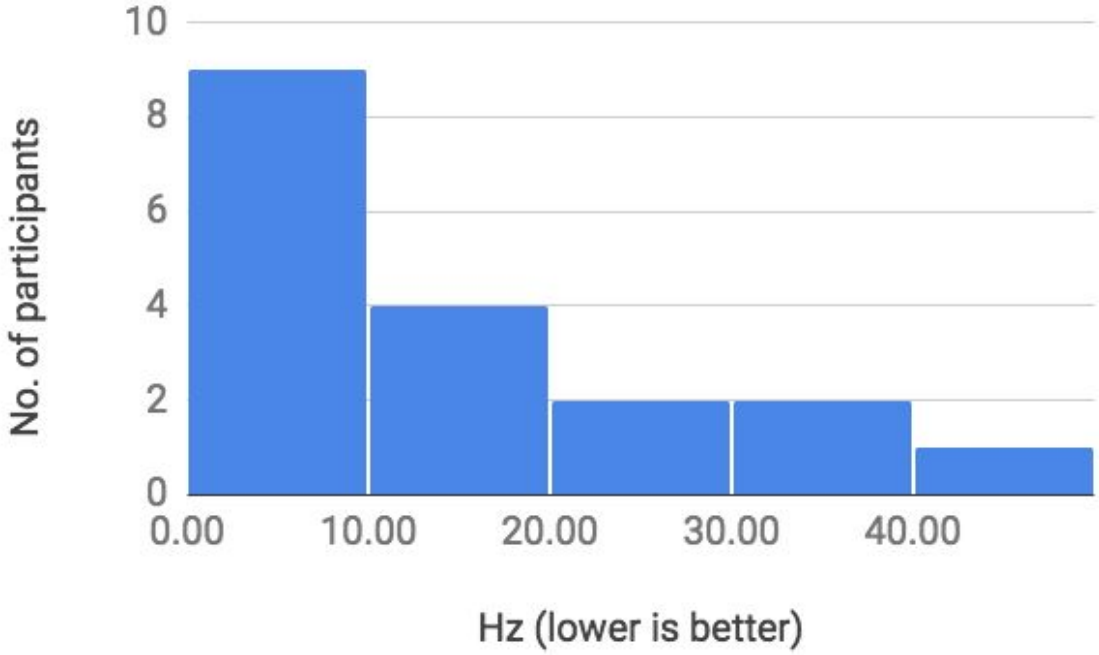
B: You’re broke again **(fall)**, aren’t you? **(fall)**

A: Don’t worry **(rise / fall-rise)**, I’ll have some money soon. **(fall / fall-rise)**

B: In that case **(fall / rise)**, here you go. **(fall)**

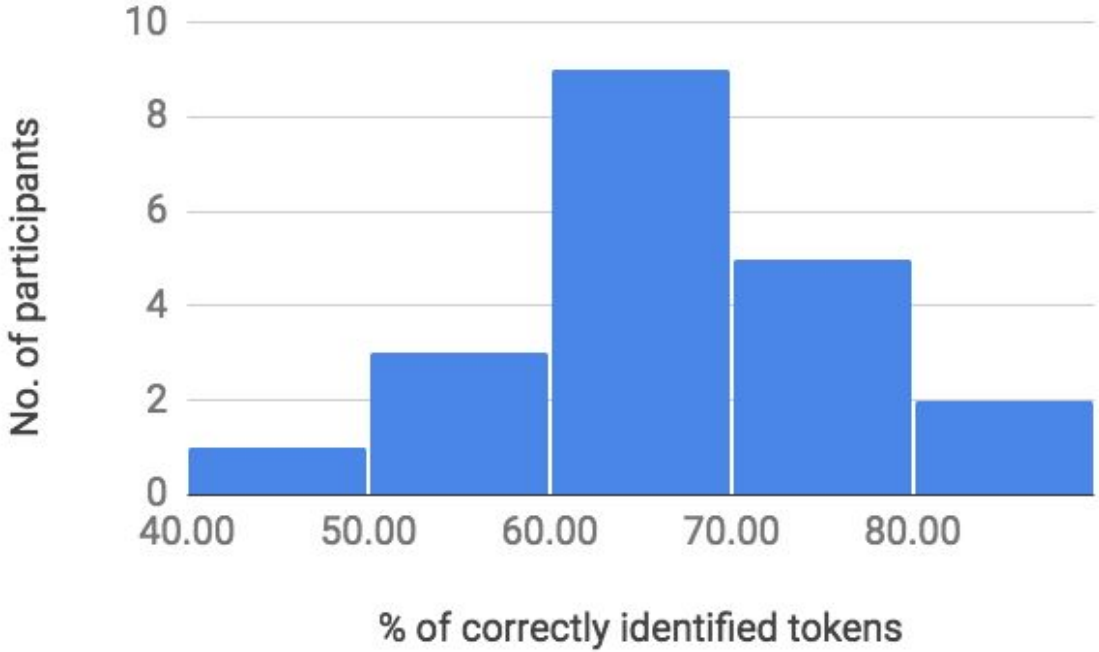
Data analysis – musical hearing tests

Pitch perception (Avg. = 19.01 Hz)



Data analysis – musical hearing tests

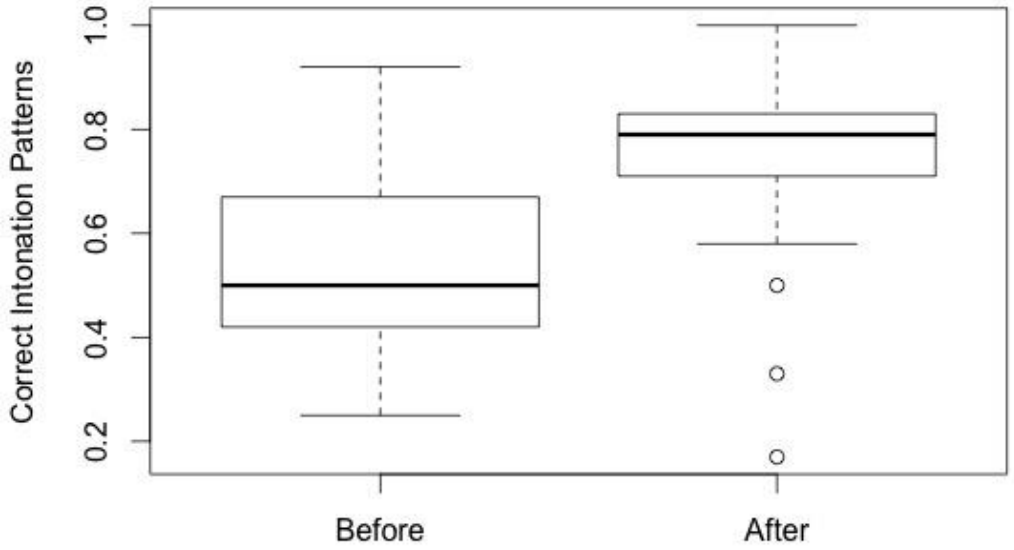
Melodic memory (Avg. = 65.83 %)



Data analysis – musical hearing tests

Rhythmic perception (Avg. = 70.80 %)

Data analysis – intonation scores before & after training



F(1,38) = 9.57, p = 0.003)

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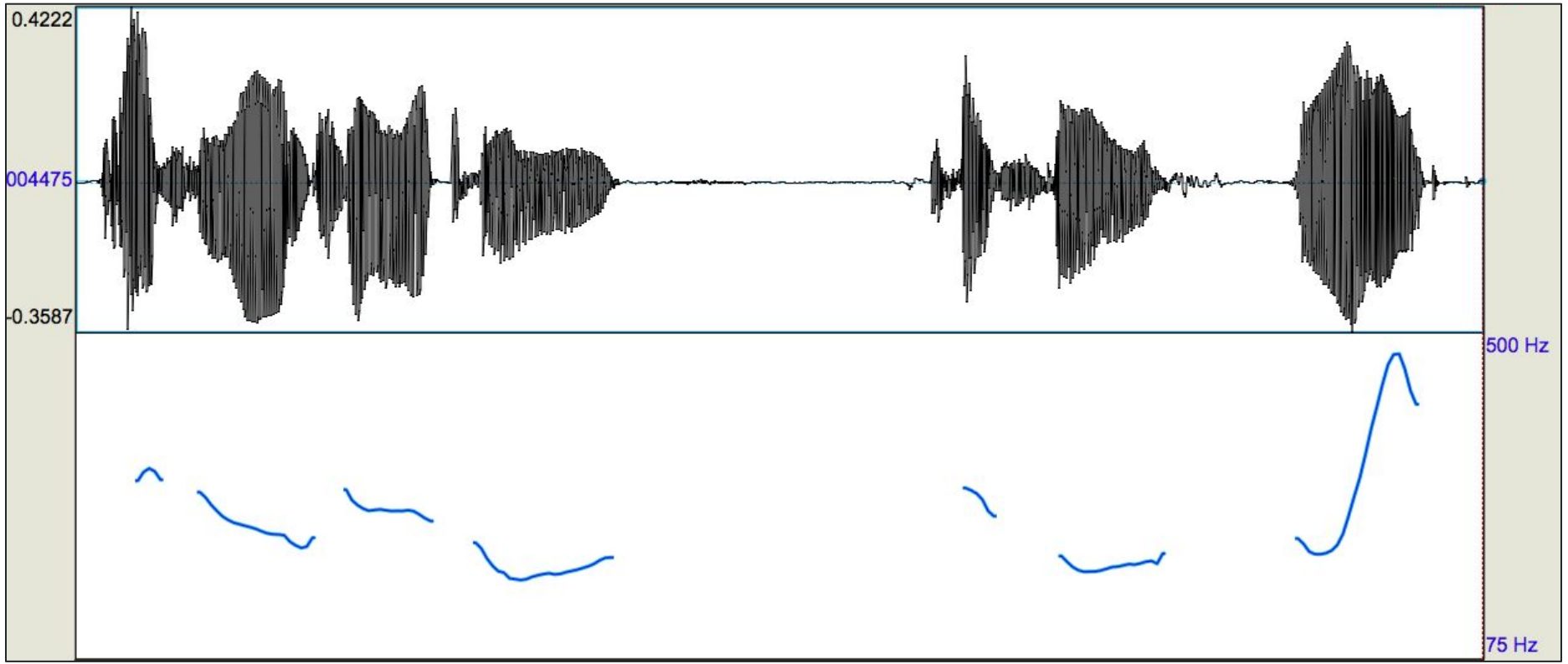
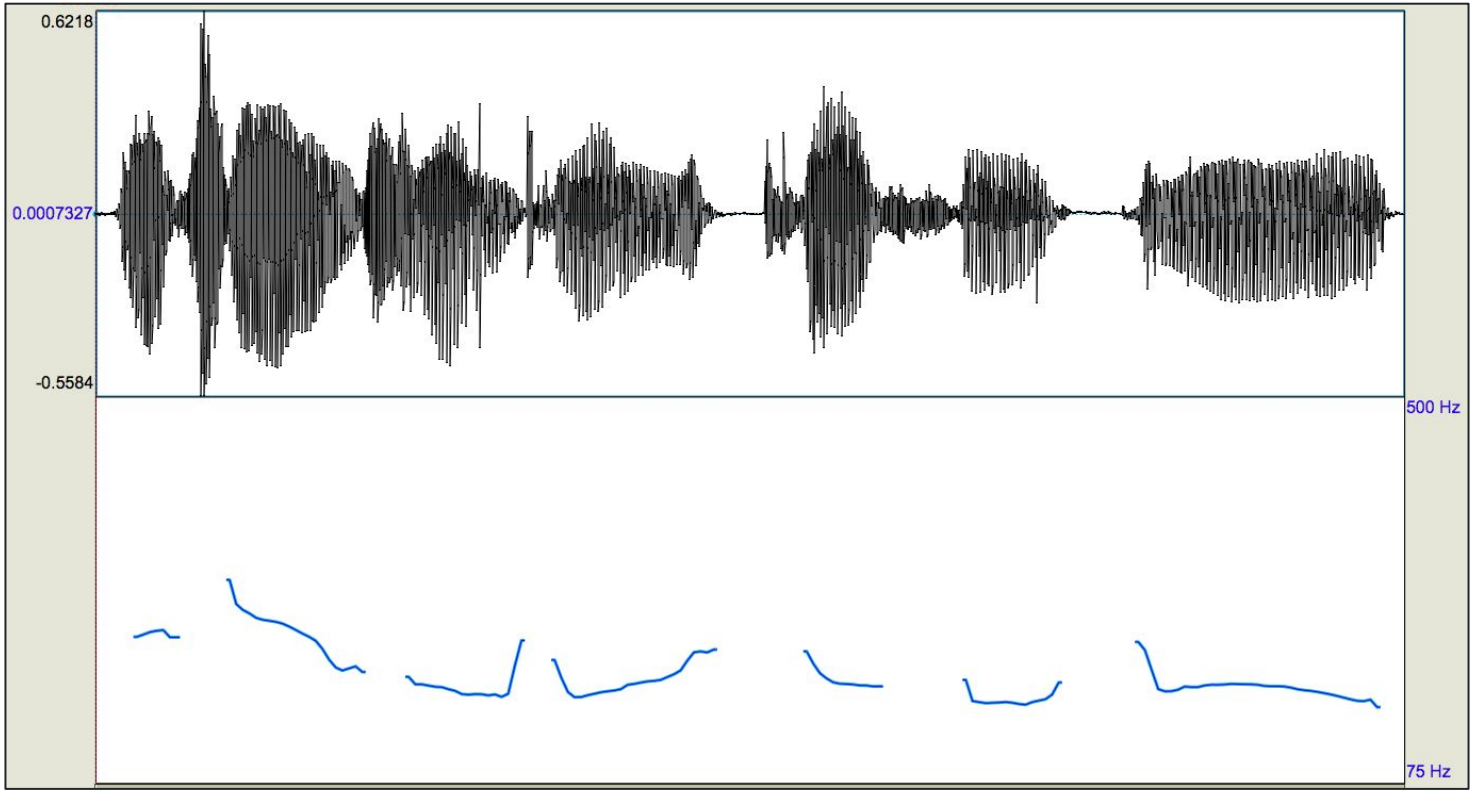
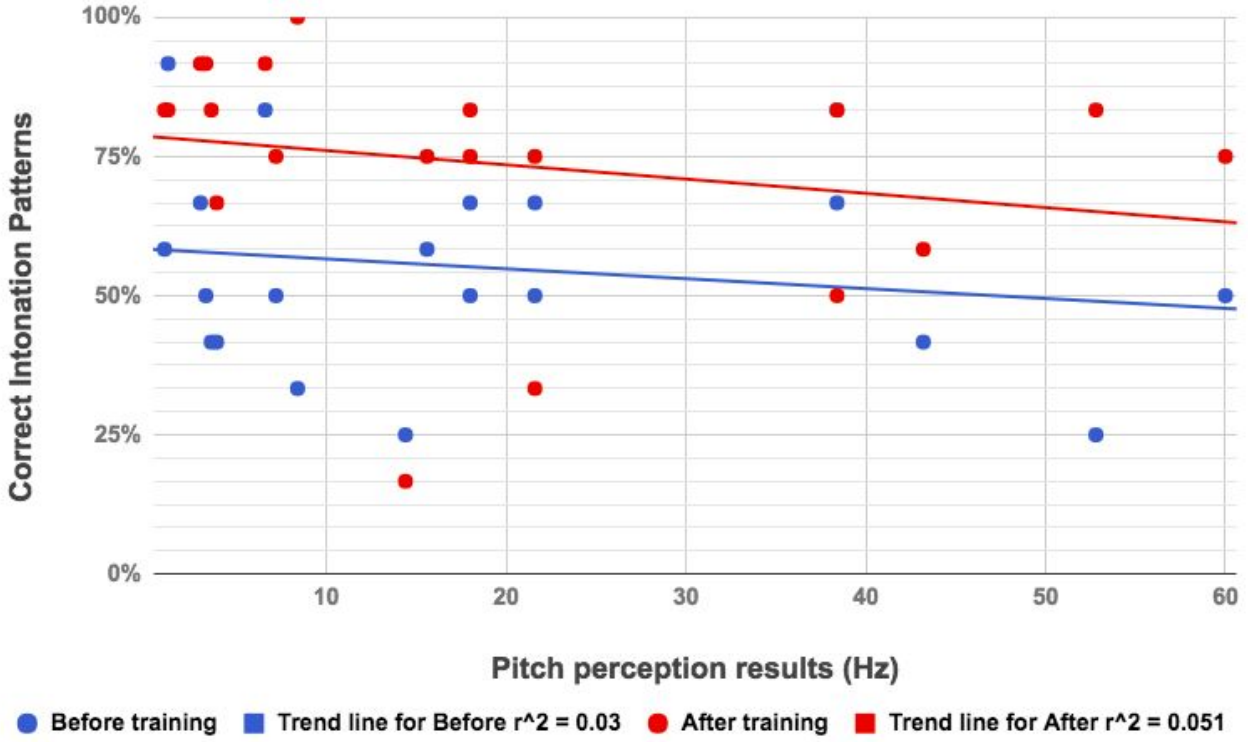
P028 (score 100%, pitch perception < 10 Hz)



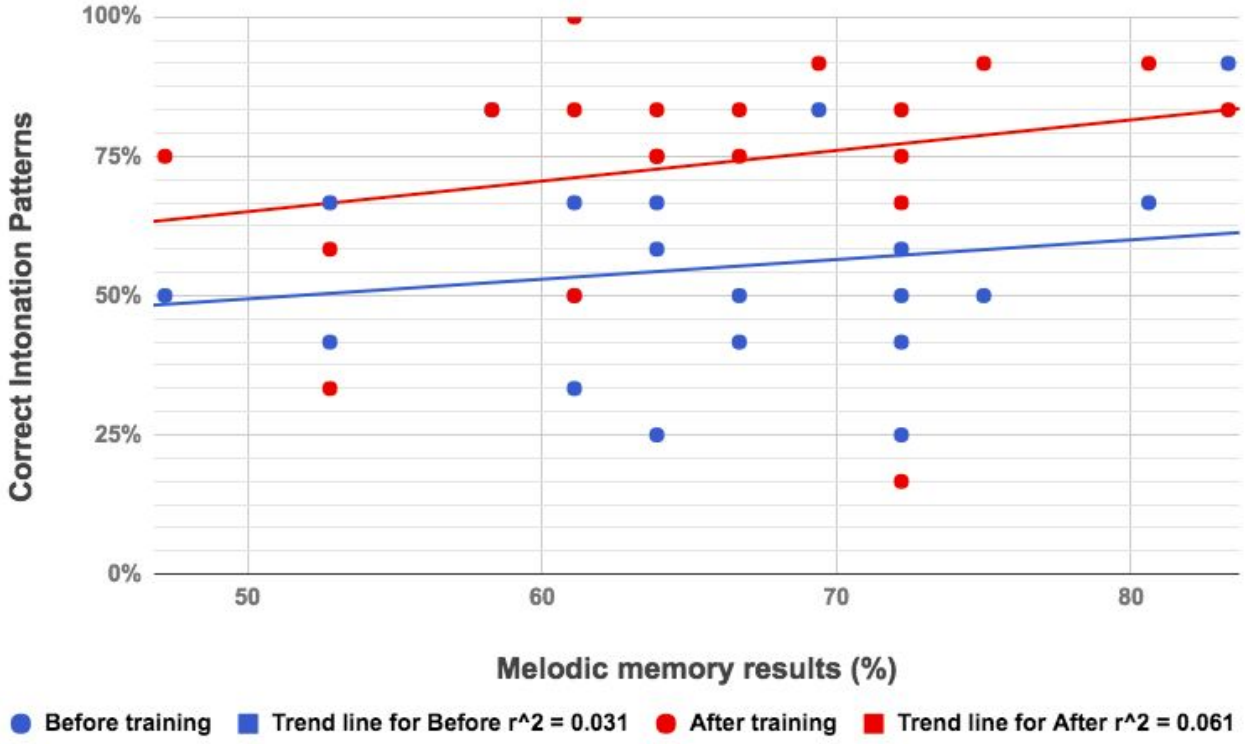
P030 (score 33,3%, pitch perception > 50 Hz)



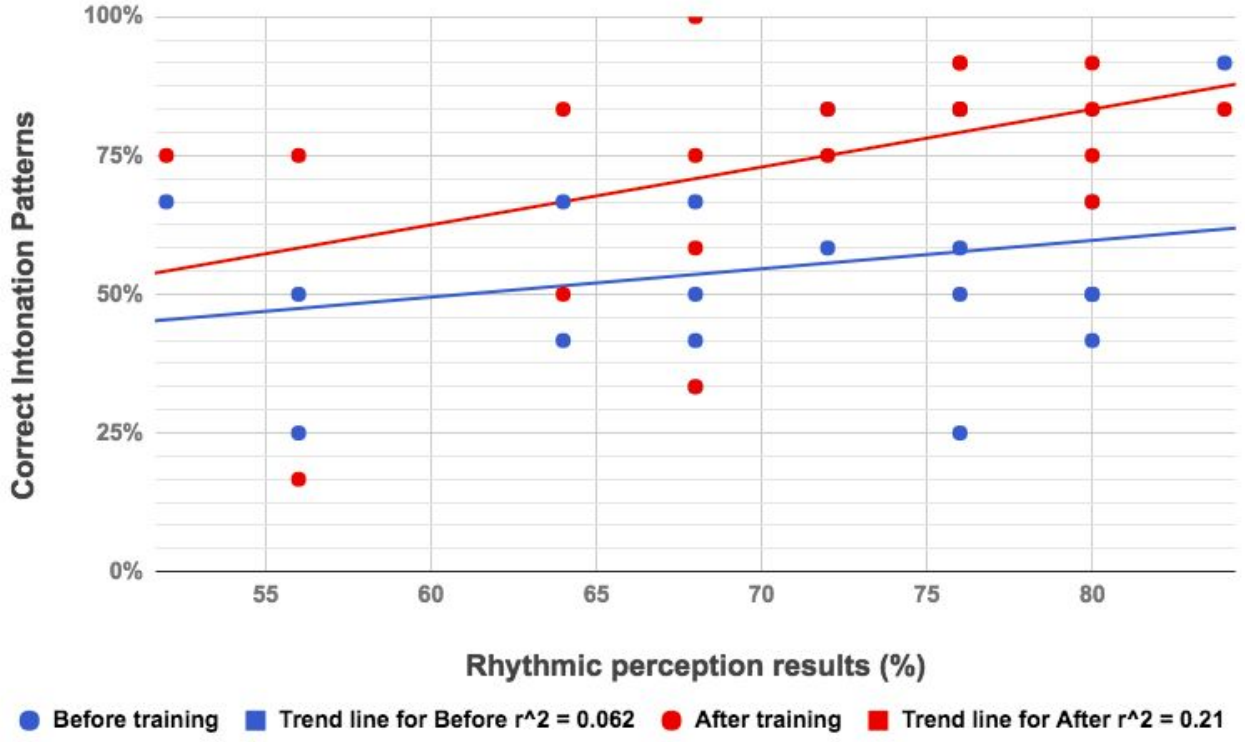
Results – intonation scores & pitch perception



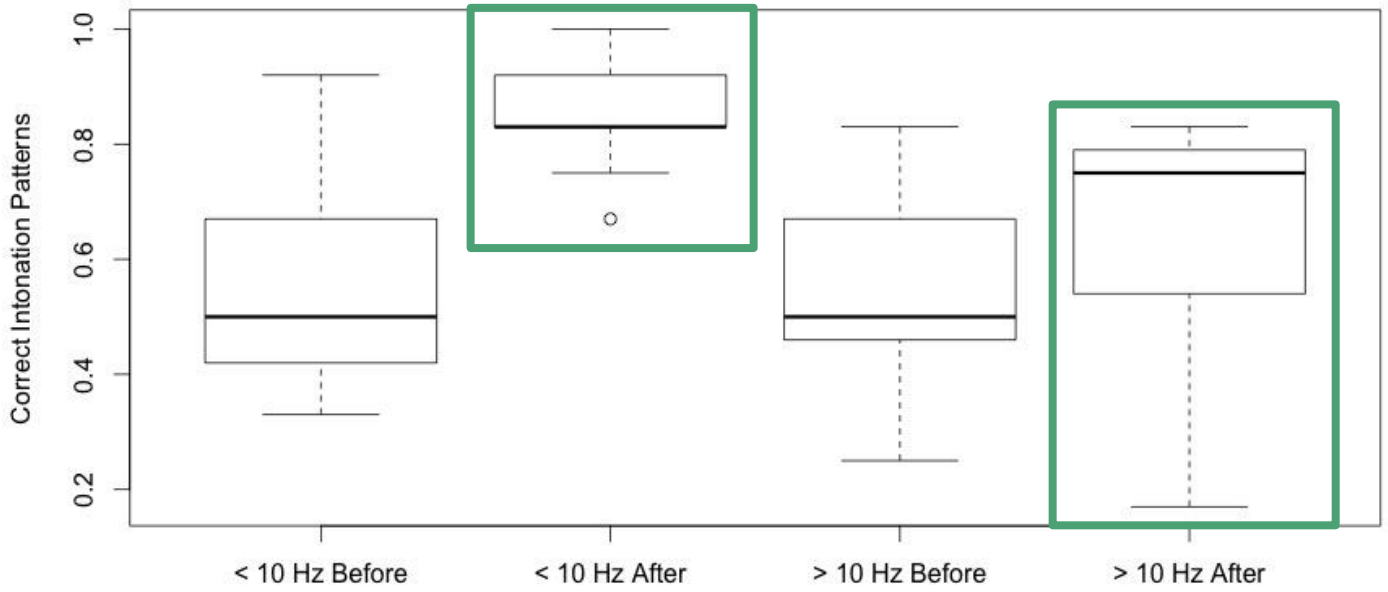
Results – intonation scores & melodic memory



Results – intonation scores & rhythmic perception

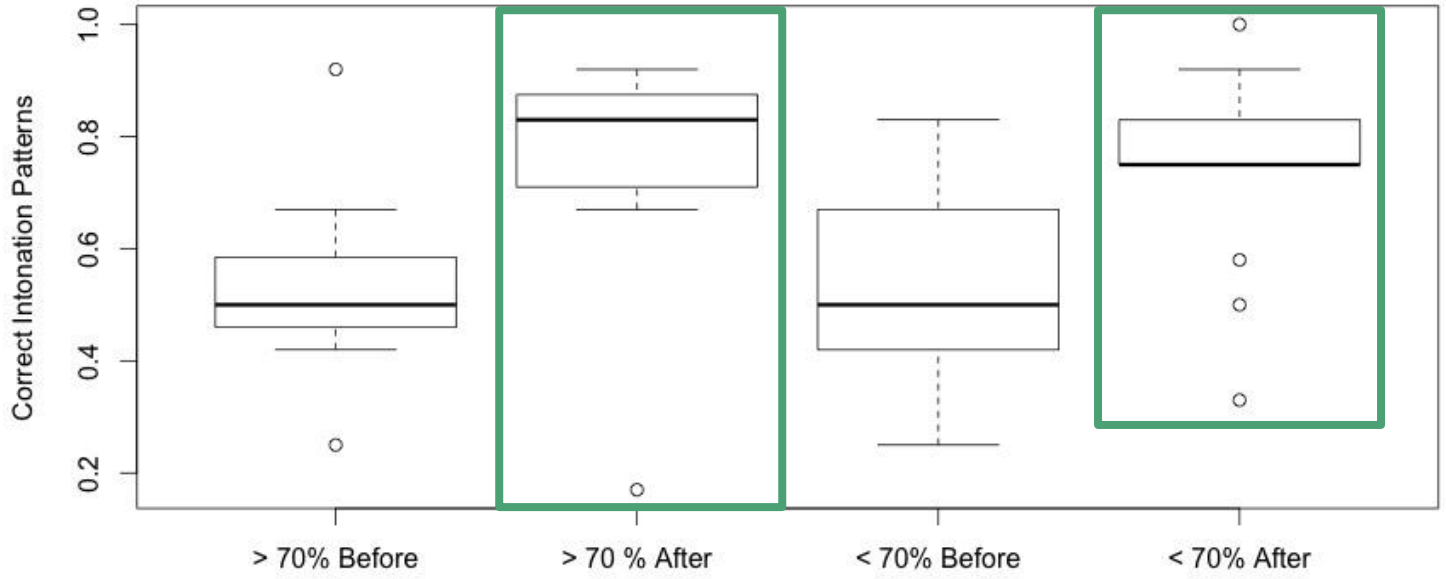


Data analysis – training & pitch perception



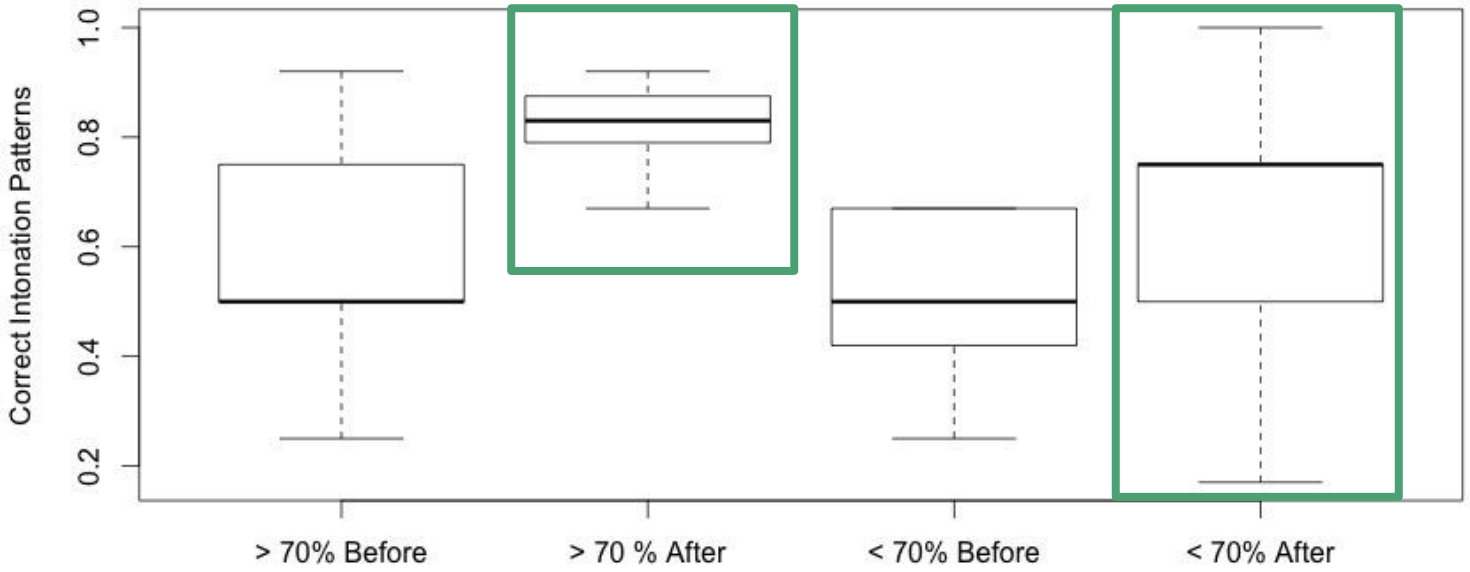
F(1,38) = 6.77, p = 0.01)

Data analysis – training & melodic memory



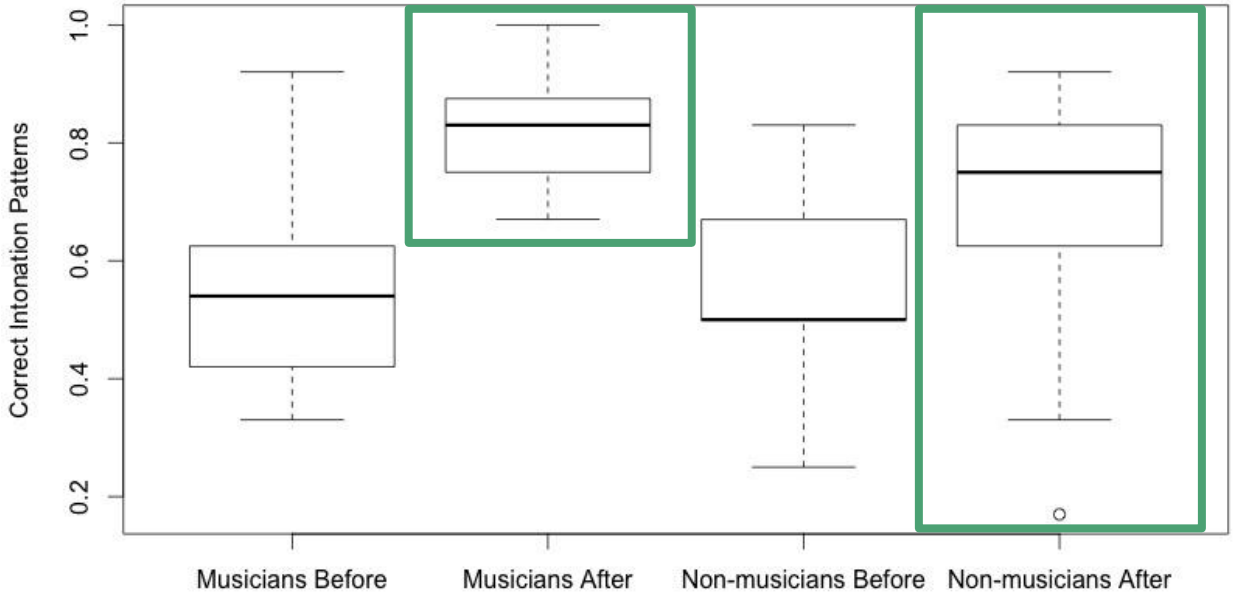
F(1,38) = 0.02, p = 0.87)

Data analysis – training & rhythmic perception



F(1,38) = 5.70, p = 0.02)

Data analysis – training & musical experience



$F(1,38) = 2.04, p = 0.17$

Conclusions

- an extensive two-year pronunciation course can significantly improve production of near-native intonation patterns
- good pitch perception and good musical rhythm can help in the aquisition of L2 intonation
- musical aptitude without formal pronunciation training is not enough
- musical aptitude can be more effective than musical experience

Selected references

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