Pitch distributions in a very large corpus of spontaneous Finnish speech

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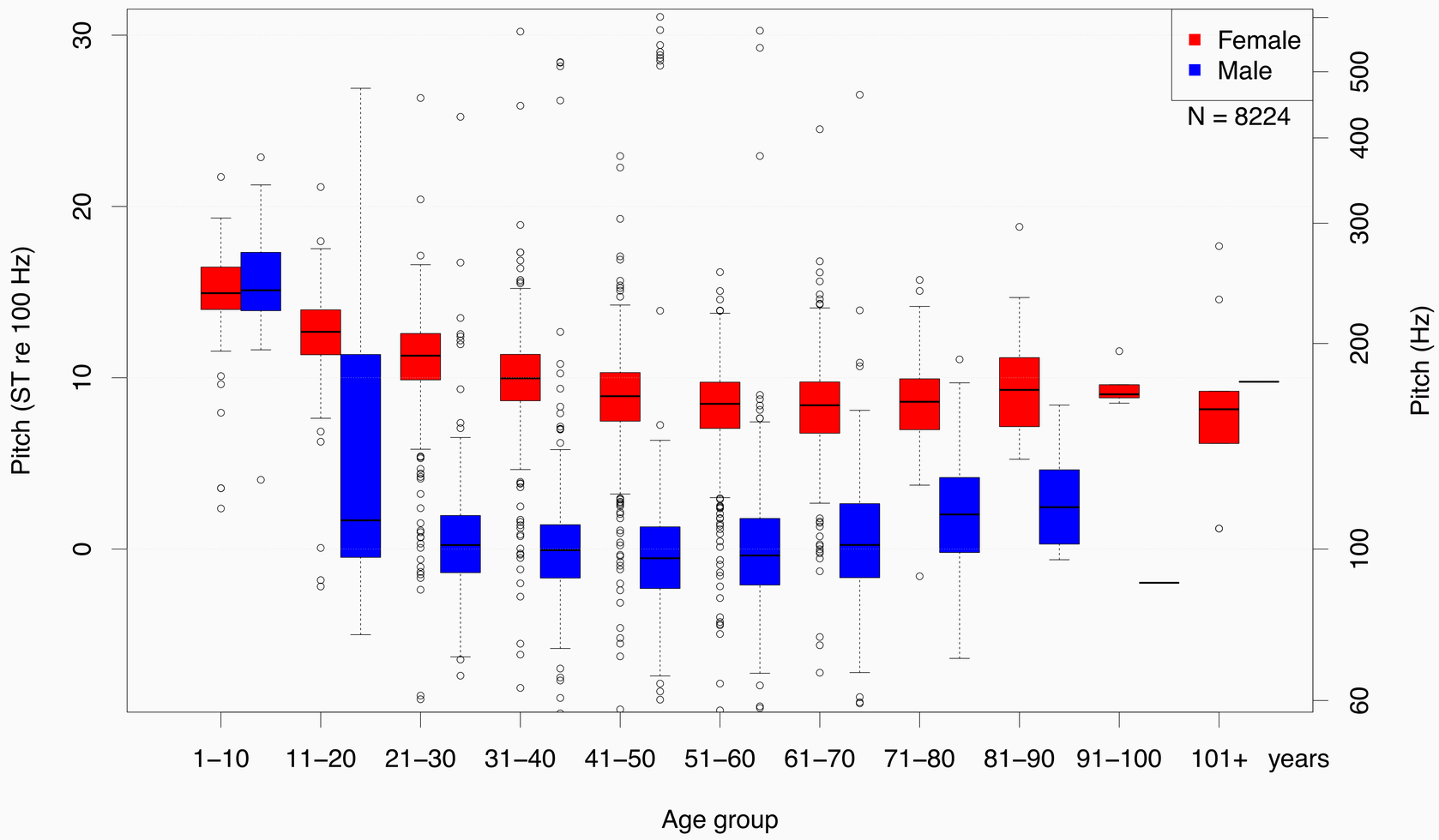
Introduction

The pitch of the human voice serves many tasks in spoken language and interaction. To study these aspects, it is necessary to have a good understanding of the individual variation in voice range. A number of studies have suggested differences in pitch between, e.g., genders (overview by Saggio & Costantini 2022), languages (Mennen & al. 2014) and between speakers of different ages (Eichhorn & al. 2018). However, the findings have been partly contradictory and often based on small datasets. The present study provides a summary of the typical pitch of 8224 speakers of Finnish.

Individual statistical modes of pitch analyzed from speakers of Finnish

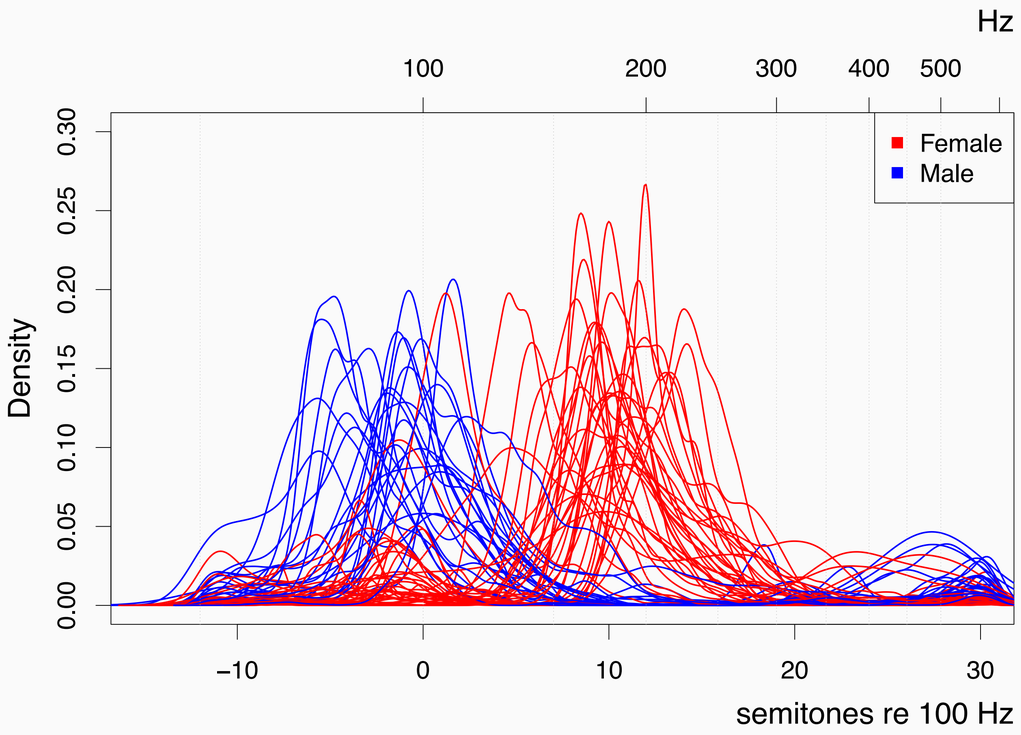


Age	N	
	Female	Male
1-10	**69**	**43**
11-20	**386**	**137**
21-30	**1348**	**414**
31-40	**1155**	**421**
41-50	**960**	**357**
51-60	**1150**	**472**
61-70	**613**	**321**
71-80	**197**	**124**
81-90	**21**	**20**
91-100	**5**	**1**
101+	**9**	**1**
All ages	**5913**	**2311**

Material and methods

- We analyzed a large subset of the *Donate Speech Corpus, v.1.0 (2022)* of spoken Finnish, including speaker metadata.
- Pitch was detected at 20 ms time steps with a Praat script.
- Pitch analysis was run in two passes (see Lennes & al. 2015).
- Speakers with < 300 pitch points were discarded. The remaining data represented 596 h of voiced speech in total.

Pitch density of 60 speakers (example)



Results and conclusions

- With a sufficient amount of recorded speech, it is possible to automatically estimate the typical pitch of an individual speaker without knowing their age or gender in advance.
- Speakers of different ages and genders tend to exhibit different typical pitch in their speech.
- When comparing pitch data between speakers, it is important to use perceptually motivated pitch scales (e.g., semitones).

References

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