

Characteristics of the West- Central-Bavarian dialect

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Introduction

The West-Central-Bavarian (WCB) dialect

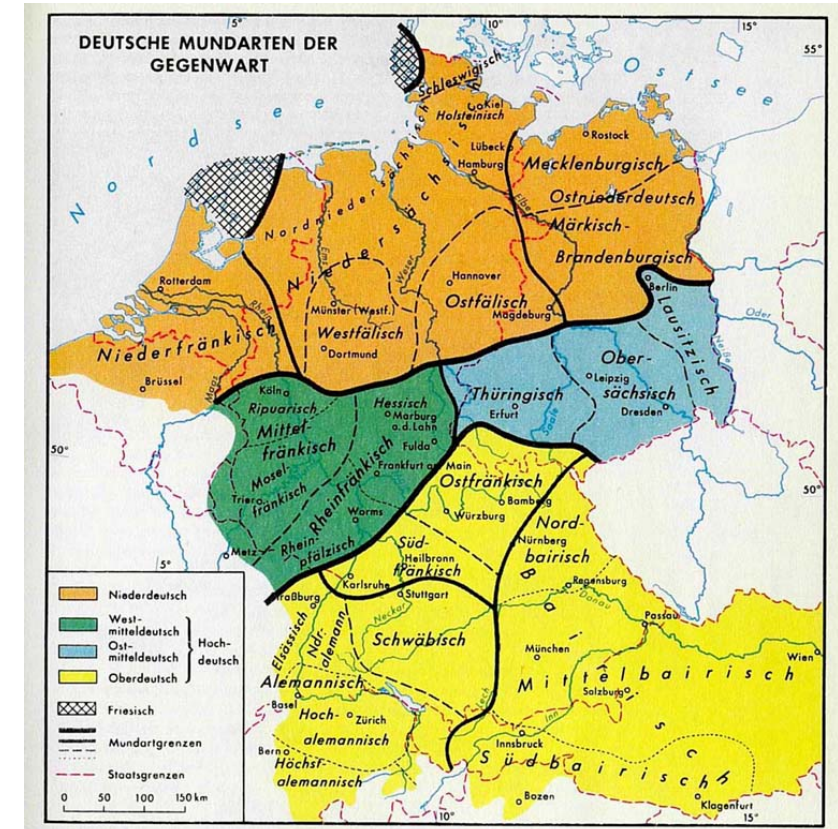
The CB dialect is spoken in the south of Germany and in most parts of Austria.

Large amount of literature concerned with descriptions of the dialect BUT based on impressionistic auditory descriptions.

e.g. Capell, 1979; Mansell, 1973; Zehetner, 1985

Sylvia Moosmüller and colleagues have contributed much to the acoustic phonetic analysis of the Bavarian dialect in Austria
→ German side remains largely unexplored

e.g. Moosmüller, 1991; 2007; 2010; Moosmüller & Scheutz, 2013



Introduction

Sound change in progress

There is much evidence that Standard German (SG) is superimposed on German dialects, causing sound change in the respective dialects.

The evidence is based on **apparent-time** studies comparing old vs. young speakers of a given population.

e.g.

Müller et al., 2011 for East-Franconian:

- the *leiden-leiten* contrast is completely neutralized by older speakers but not by younger speakers

Bukmaier & Harrington, 2014 for Augsburg German:

- Post-vocalic /s-ʃ/ contrast (e.g. *wesst/wäscht*) is differentiated more by younger than by older speakers

Determine whether young show more standard characteristics than old on some attributes of vowels where Bavarian and the standard are known to differ.

1. Bavarian has two different a-Variants where the Standard has just one vowel phoneme

Standard 'Kabel/Gabel' = /ka^awe, ga^awe/ in Bavarian

2. Bavarian makes a phonological long/short vowel distinction that does not have a one-to-one correspondence to Standard tense/lax

Bavarian	Long	Long	Short
	<i>Wiese</i>	<i>Tisch</i>	<i>wissen</i>
Standard	Tense	Lax	Lax

3. Bavarian has no ± round distinction in front vowels

schön: /ʃe/ vs. /ʃø̃n/ *Hütte*: /hɪtn/ vs. /hytə/ (Bav. vs Stand.)

Method

Speakers

YOUNG

- (Longitudinal) recordings of WCB speaking primary school children from the 1st grade (on)
- 18 children (ø 6,5 years; 10 f, 8 m)

OLD

- (One-time) recordings of adults (50 years and older) from the same dialect area
- 13 adults (ø 60,6 years; 8 f, 5 m)

Target sounds: post-vocalic /l/, **monophthongs**, diphthongs

- Susceptible to both dialect variations and sound change
- Dialect deviates here particularly strongly from SG

Database:

58 items x 31 speakers x 4 repetitions = 7.192 tokens

Monphthongs: /a/, /ɑ/, /i/, /u/, /o/, /e/, /ɛ/

34 items x 31 speakers x 4 repetitions = **4.216** tokens

Experiment

Picture naming task without written form of the word

- Dialectal, semi-spontaneous data
- Single words in controlled phonetic context
- Target words: common words, that are easy to visualize

Preparation of acoustic data

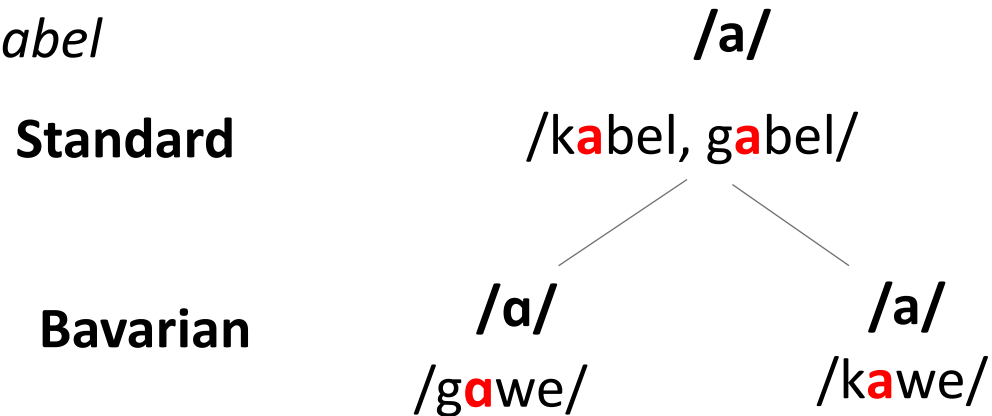
1. Automatically segmented and annotated with MAUS (Munich Automatic Segmentation System) (Kisler et al., 2017), Formant tracking with Praat (Boersma, 2001), boundary and formant correction if need be in EmuDB (Winkelmann, Harrington & Jänsch, 2017)
2. Linear time-normalisation of F1, F2 and F3 of each vowel between acoustic onset and offset to 11 data points
3. Conversion of dynamic F1, F2 trajectories of each vowel into three DCT coefficients (Watson & Harrington, 1999) that are proportional to the formant's mean, linear slope, and curvature (hence a 6 dim. space)
4. Z-score normalisation based on by-speaker mean and sd calculated across all vowel data-points between onset and offset for that speaker with respect to /a/, /o/, and /e/

Hypotheses

A. /a, ɑ/ is closer together for children than for adults

1. Bavarian has two clearly different a-Variants while SG has just one open vowel quality

e.g. *Kabel, Gabel*



- Adults: /ɑ/ should be closer to /o/ and further from /a/
- Children: other way round
 - shift in the direction of SG

Hypotheses

B. There is a greater quality difference between long and short vowels for young than for old

2. Bavarian makes a phonological long/short vowel distinction that does not have a one-to-one correspondence to Standard tense/lax

Bavarian long vs. short <i>Tisch vs. wissen</i> /di:f/ /visn/ mostly quantity . Long has V:C, short has VC:	Standard tense vs. lax <i>mieten vs. Mitte</i> mostly quality : tense is more peripheral and with V: (but no consonant-length differences)
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- Adults: no or little quality difference between long and short vowels, which then are large caused by duration
- Children: quality differences which are far greater than would be expected from duration alone
 - shift in the direction of SG

Hypotheses

C. The quantity correlation between vowel and following consonant is weakend for younger speakers

- Bavarian:
Tisch /di:f/ vs. wissen /visn/ distinguished via quantity differences. Short vowels are always followed by fortis consonants (**VC:**) and long vowels are always followed by lenis consonants (**V:C**)
- Standard:
mieten /mi:tn/ vs. Mitte /mitə/ distinguished via quality differences (tense vs. lax) but no consonant-length differences

For children long-short vowel pairs should show a greater difference in vowel duration and a smaller difference on consonant duration

➤ shift in the direction of SG

Hypotheses

D. There is more rounding in front vowels for young than for old

3. Bavarian has no \pm round distinction in front vowels

Rounding correlates with position:

- original front vowels are always unrounded, back vowels are always rounded
- front rounded vowels /y:, ʏ, ø:, oe/ in loan words are derounded

schön: /ʃe/ vs. /ʃøn/ *Hütte*: /hɪtn/ vs. /hʏtə/ (Bav. vs Std.)

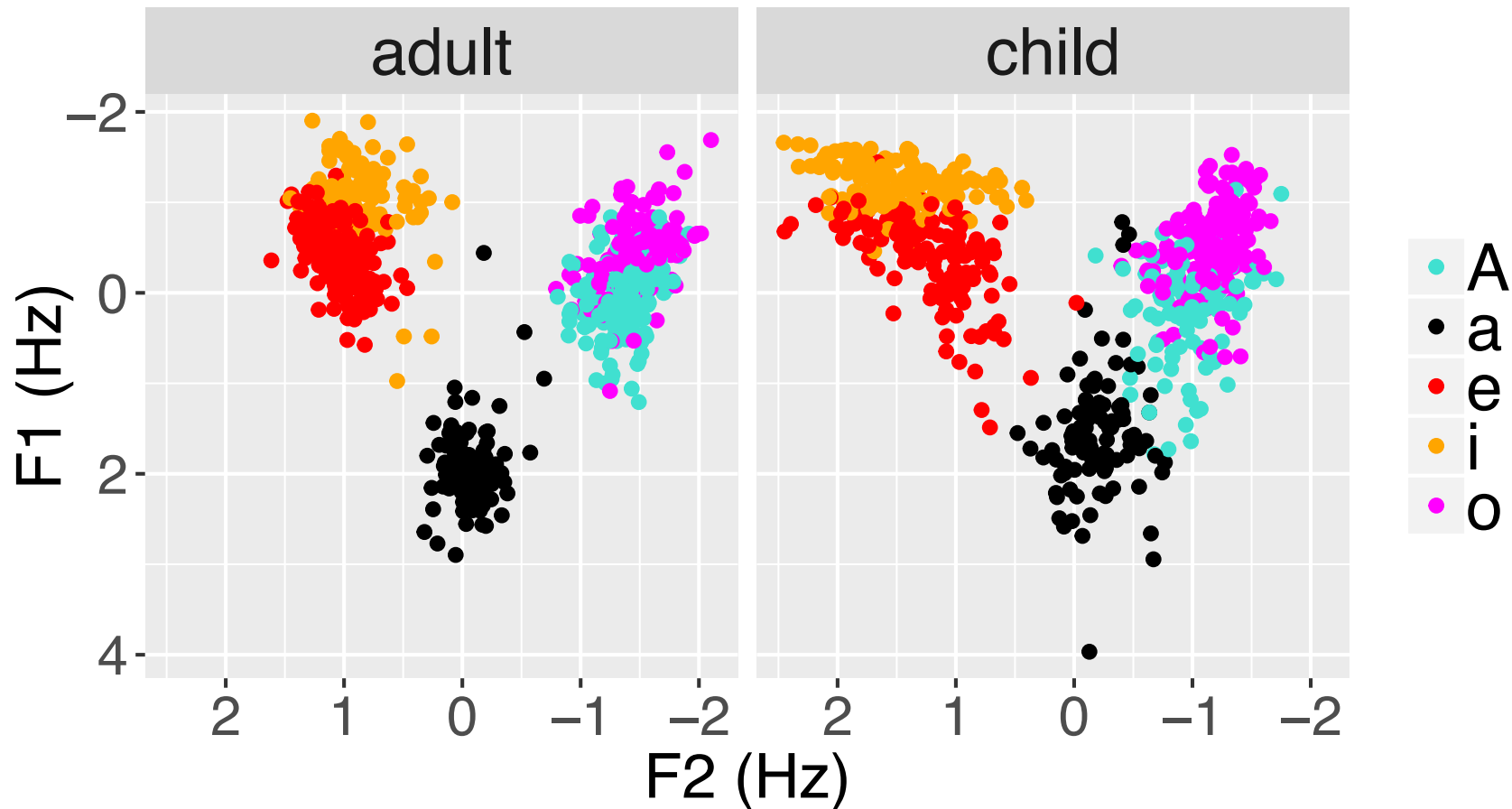
→ BUT correlation is weakened: /ø/ and /y/ do occur in recent loan words

Hypotheses

- A.** /a, ʌ/ is closer together for young than for old
- B.** There is a quality difference between long and short vowels for young but not for old
- C.** The quantity correlation between vowel and following consonant is weaker for younger speakers
- D.** There is more rounding in front vowels for young than for old

Results

A. /a, ɑ/ is closer together for children than for adults



/A/ = Gabel, Glas, Hase, Sack

/a/ = Kabel, Käse

/e/ = Besen, lesen, Reh, Schnee, Vögel

/o/ = Hose, Rock, Rose, Stock

/i/ = Dieb, Tisch, Wiese

Acoustic parameters

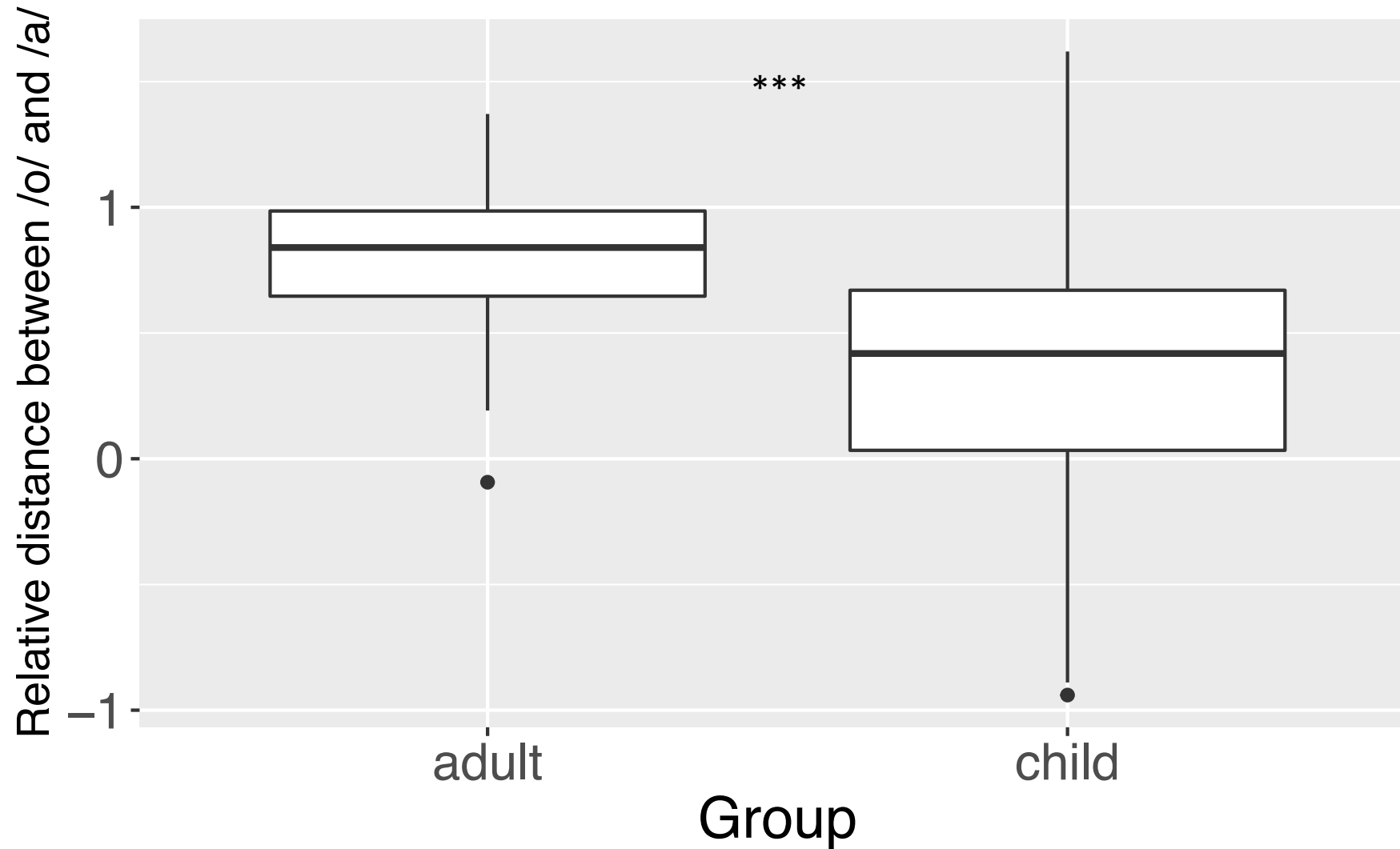
Relative distance of /ɑ/ to /o, a/

These relative distances were calculated separately per speaker to the same speaker's /o/-mean and /a/-mean in the 6-dim. space using the orthogonal projection ratio (Stevens et al, 2019):

- a distance of ± 1 occurs when /ɑ/ is positioned at either of these means respectively
- a value of 0 is when an /ɑ/ is intermediate between the two

Results

Relative distance of /a/ to /a,o/



Orthogonal projection ratio
young vs. old on /a/

- 1 means close to /o/
- -1 means close to /a/

Results

B. There is a greater quality difference between long and short vowels for young than for old

Analysed words

Long

Short

/i/

Dieb, Tisch, Wiese

/di:b, di:f, vi:sn/

Hütte, Spinne, Schlüssel

/hitn, spin, flisl/

/e/

Besen, lesen, Reh, Schnee, Vögel

/bɛ:sn, le:sn, rɛ:, ʃnɛ:, fe:gl/

beten, Löffel, Messer, Schnecke

/bɛtn, lefe, mese, ʃnɛknj/

/a/

Kabel, Käse

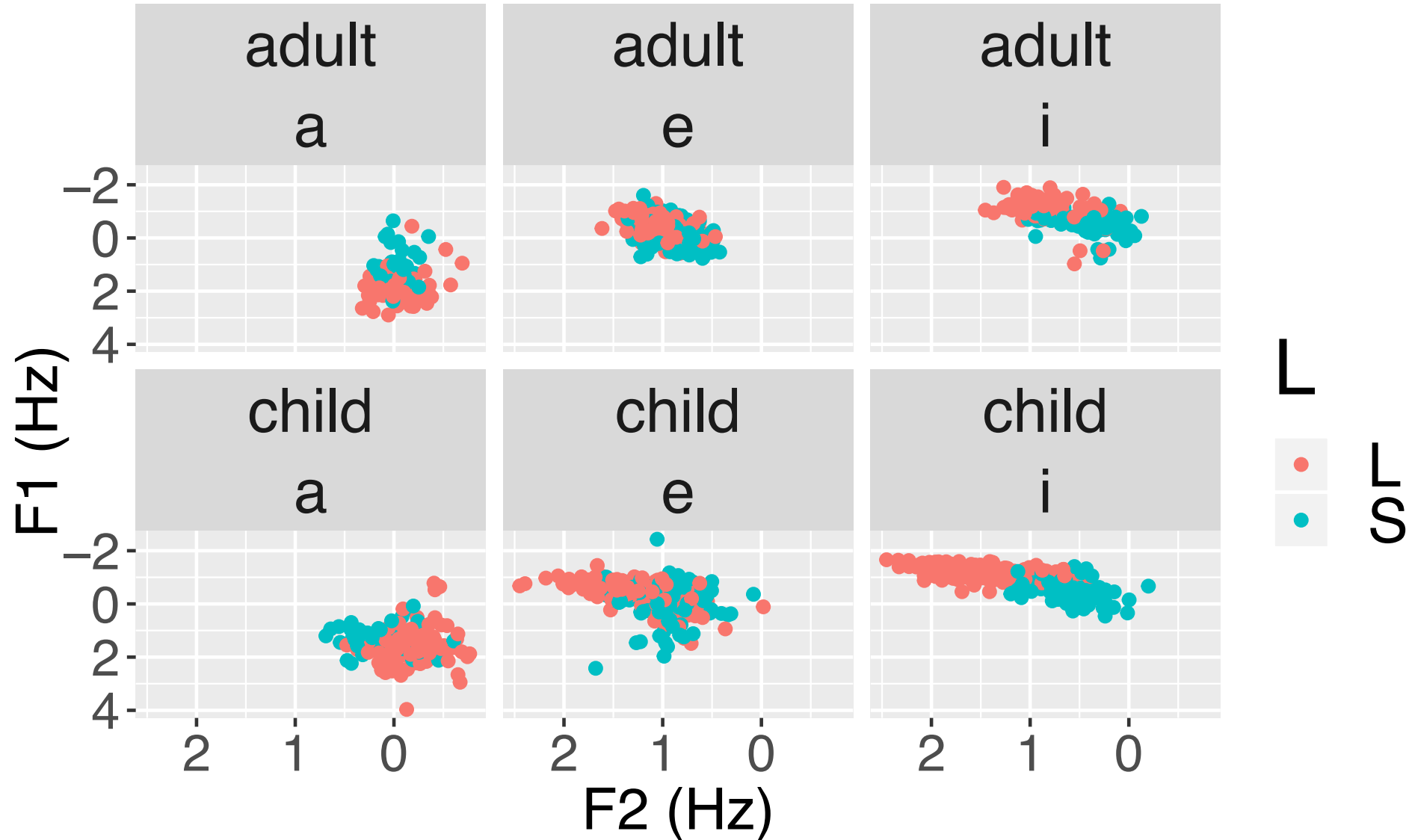
/ka:be, ka:s/

Klasse

/klas/

Results

B. There is a greater quality difference between long and short vowels for young than for old



Acoustic parameters

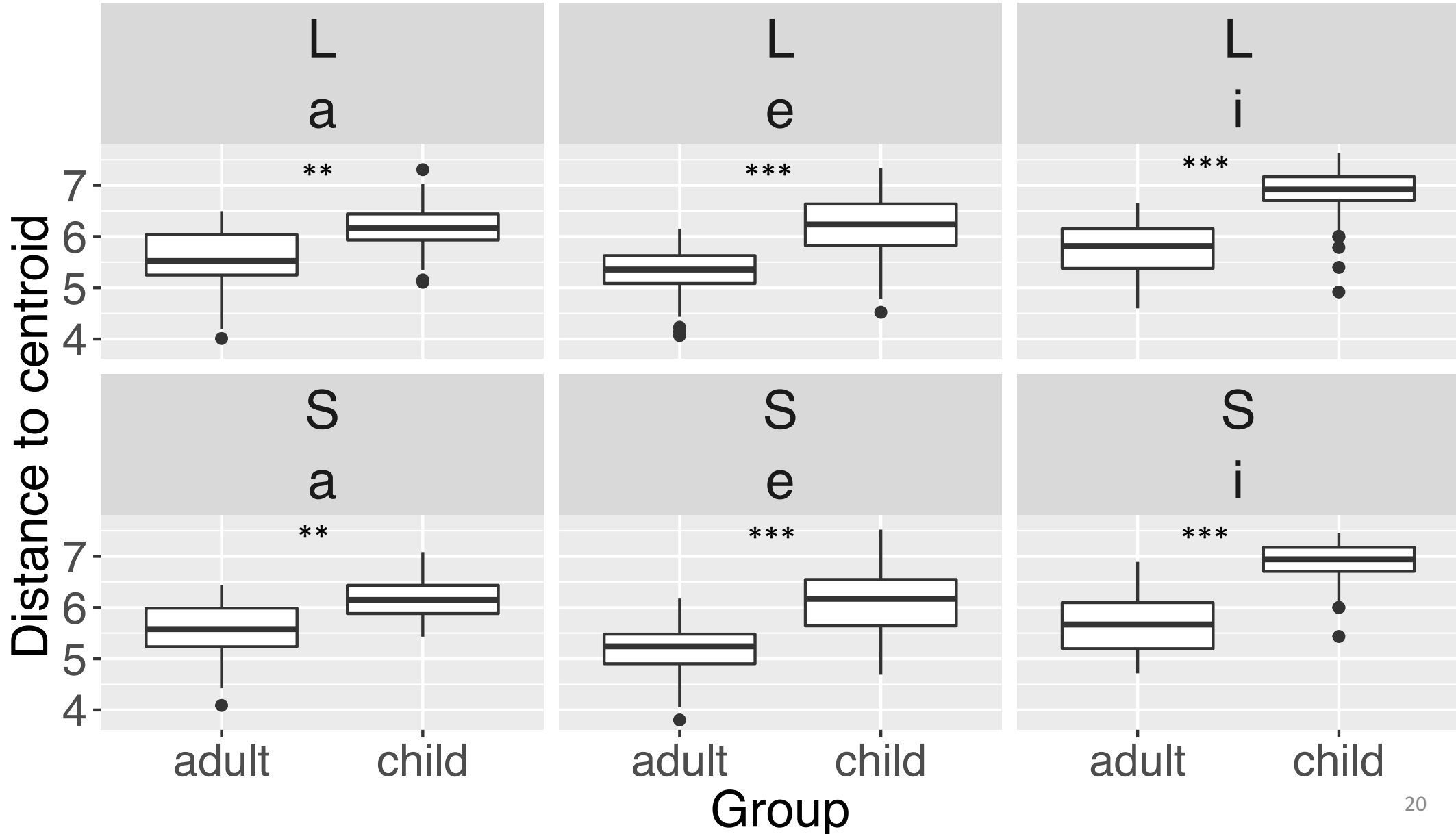
Distance between long/short vowels

We calculated the Euclidean distance between same vowel pairs in the 6-dim. F1xF2 DCT space of all long vowels to the centroid (mean) of all short vowels and *vice-versa* again separately per speaker.

The Euclidean distances are large if there is a big quality difference between long/short vowels.

Results

Inter-Euclidean distance between short-long vowel pairs
in a 6-dim F1xF2 DCT space

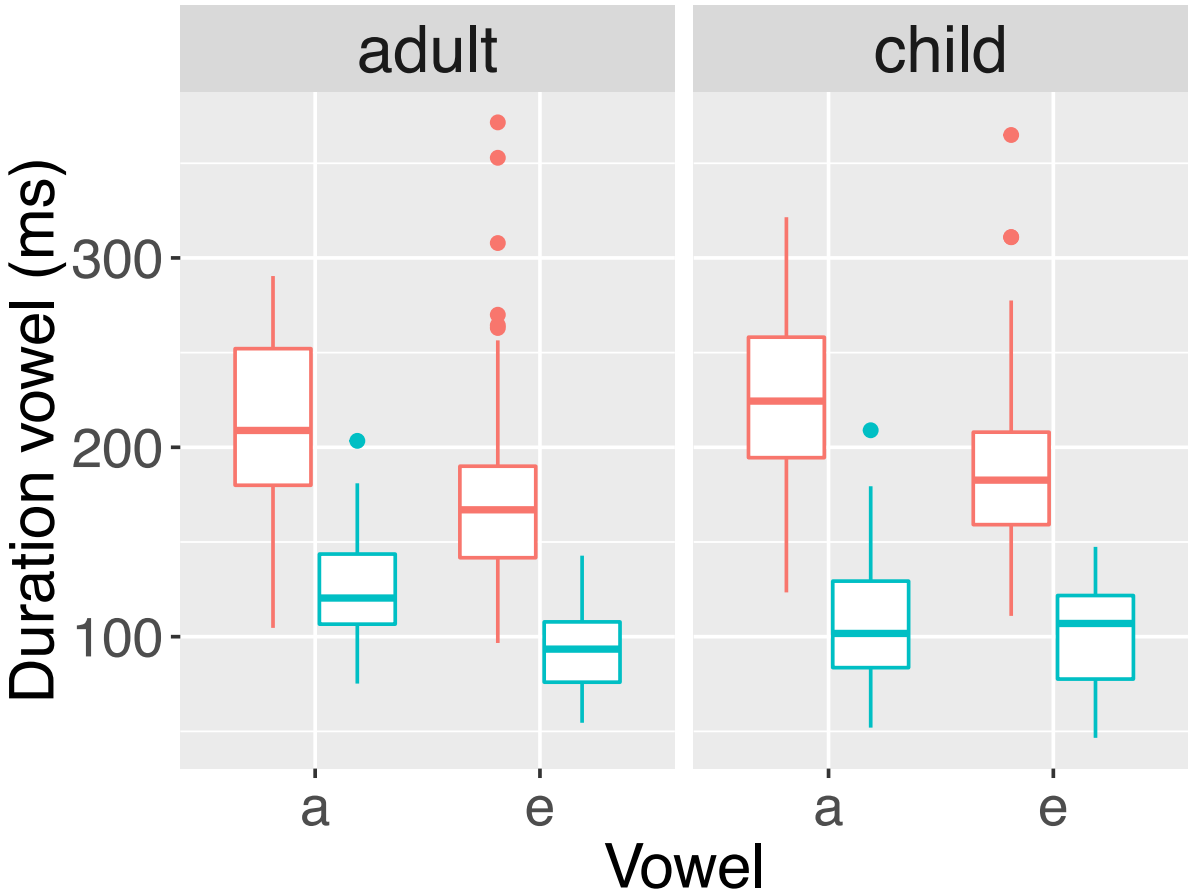


Results

C. Vowel duration separates ± long pairs to a greater extent in young than in old

Words

Besen, lesen vs. Messer
Kaese vs. Klasse



Long vowels are longer and short vowels are shorter

Significant for both groups

But young makes greater use of vowel length in distinguishing short-long vowel pairs
--> L-S difference bigger for young

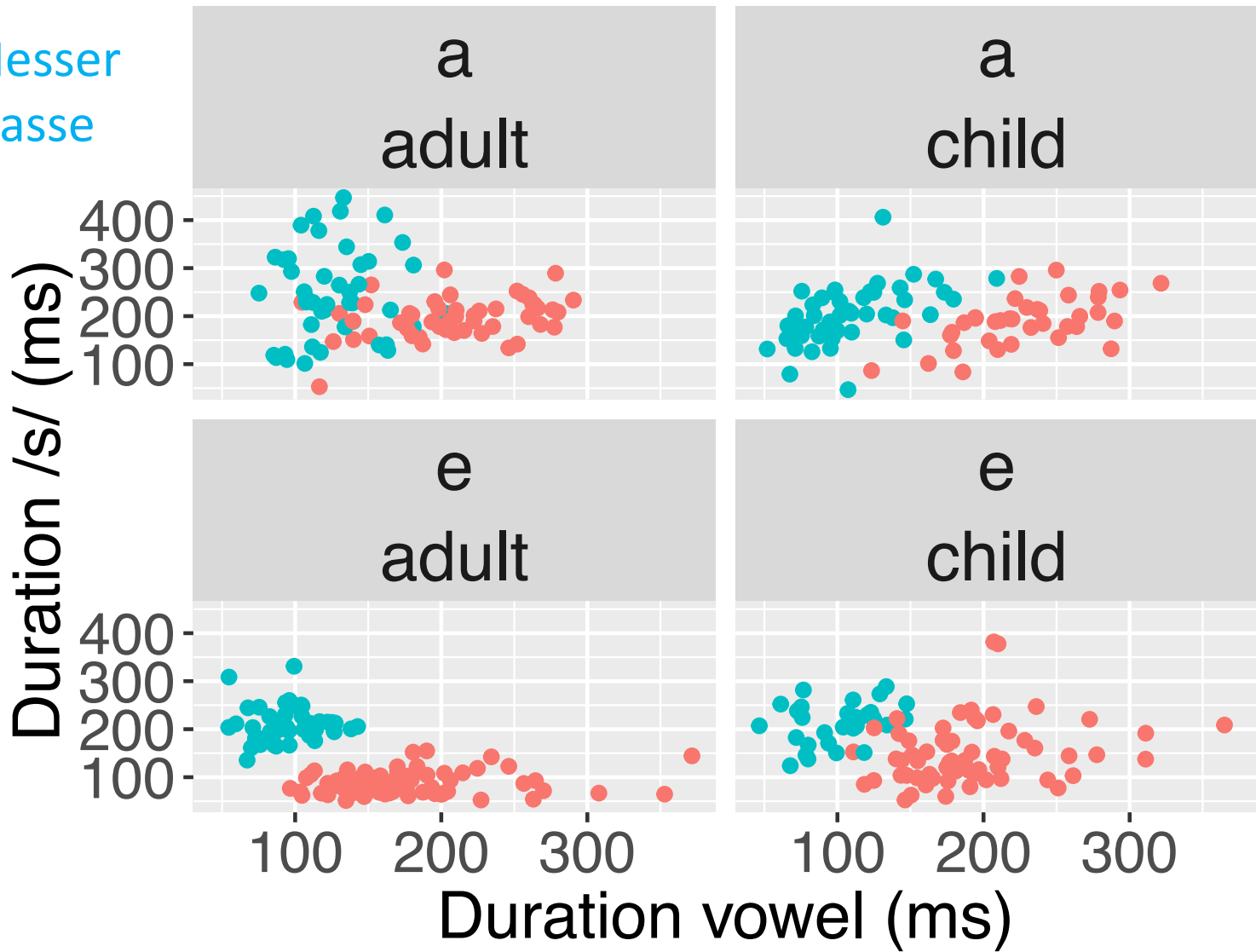
Length
L
S

Results

C. Greater consonant length distinction for old

Words
Besen, lesen vs. Messer
Kaese vs. Klasse

Old makes greater use of consonant length in distinguishing short-long vowel pairs

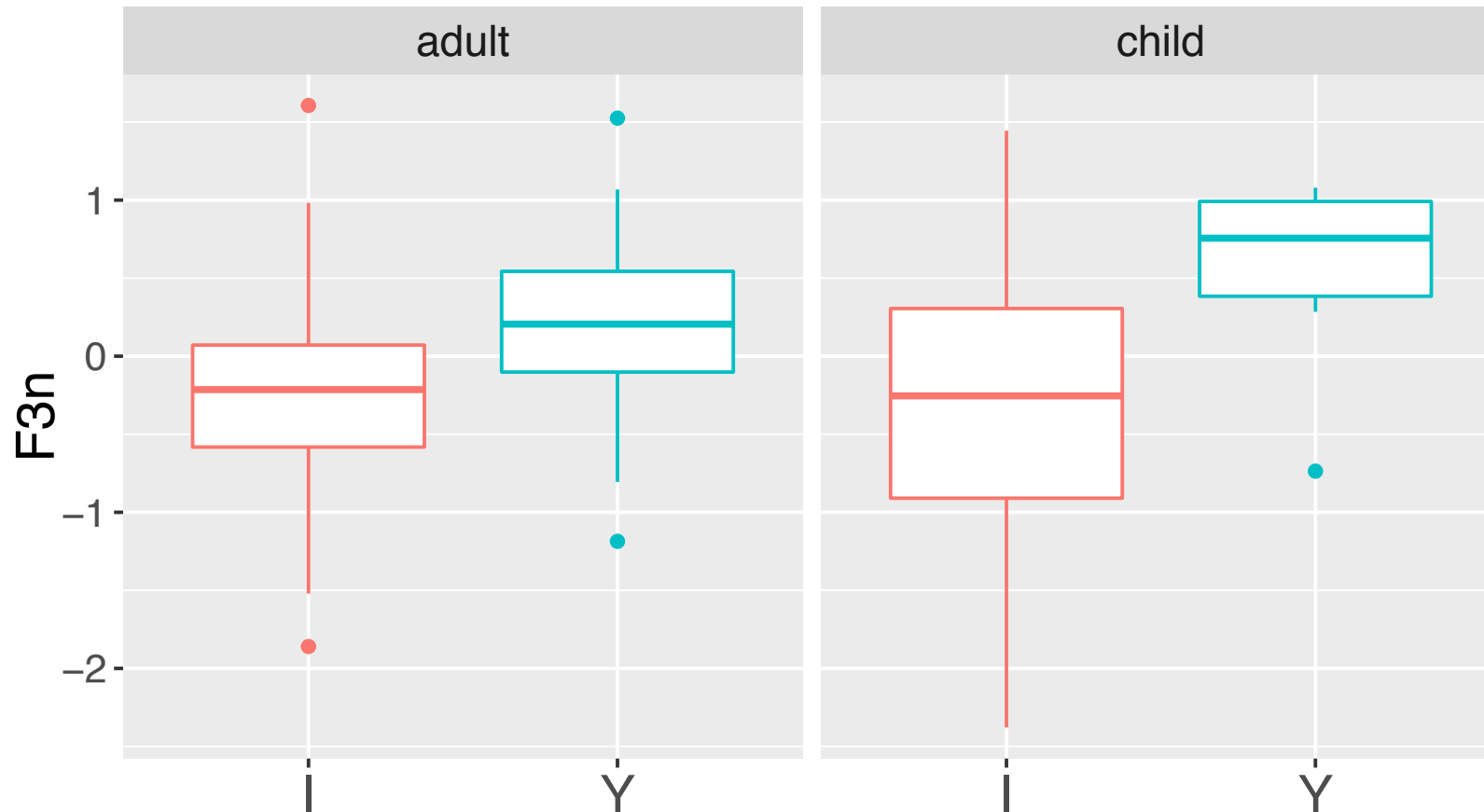


Length
L
S

/i/ and /y/ has almost the same values for F1 and F2. In order to distinguish these vowels F3 has to be considered...

Trautmüller & Öhrström, 2006

Greater differences in F3 for children than for adults



Words

/i/ = Spinne

/y/ = Hütte, Schlüssel

D. Derounding of front vowels

Problem:

Rounding not reliably measurable by acoustic cues

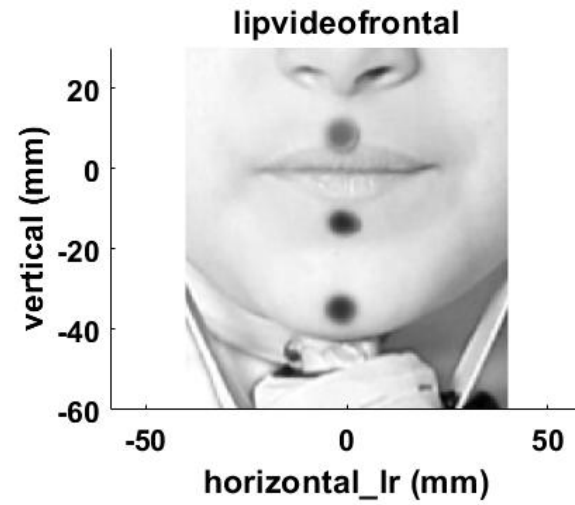
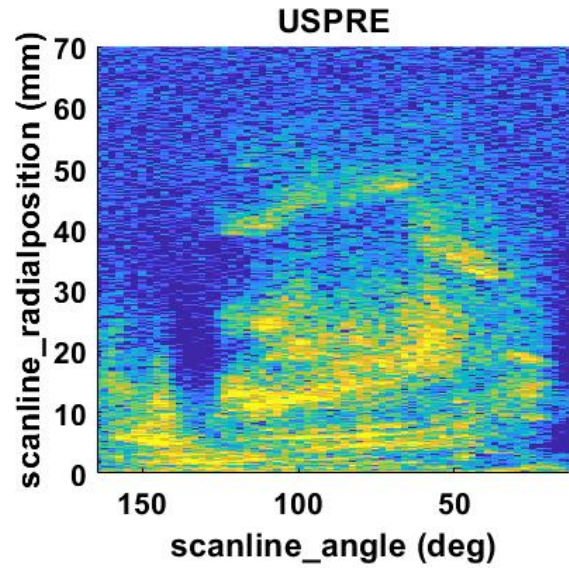
Visual cues convey rounding better than height and backness

Traunmüller & Öhrström, 2006

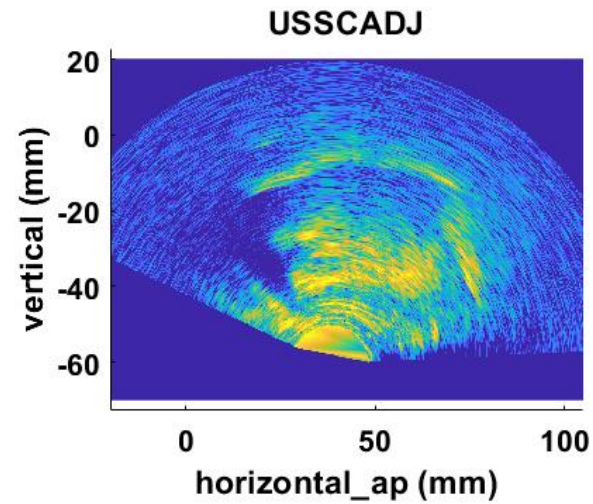
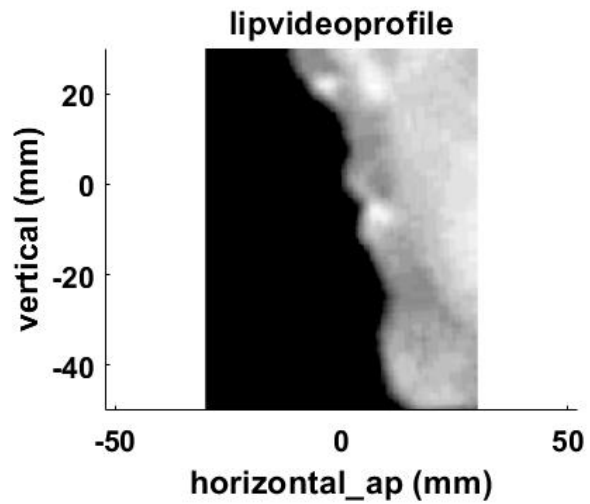
Physiological parameters

- calculate degree of lip protrusion by means of physiological data from Ultrasound recordings
- Parameterized measures (in mm) of the lip in clearly rounded vowels normalized over all 4 repetitions of the respective word are extracted as baseline for front vowels where the degree of rounding has to be examined

Physiological parameters

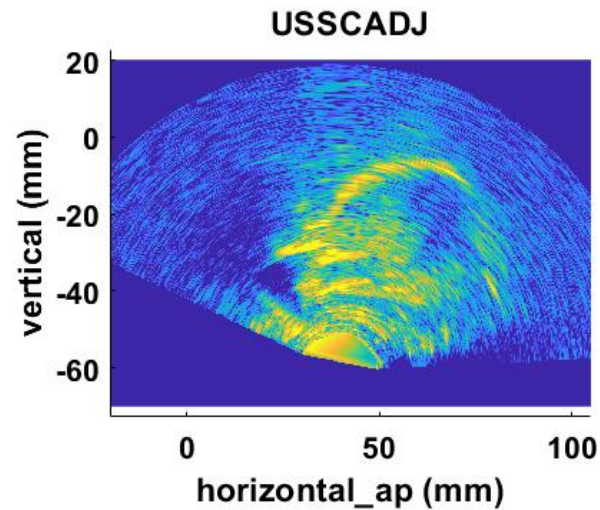
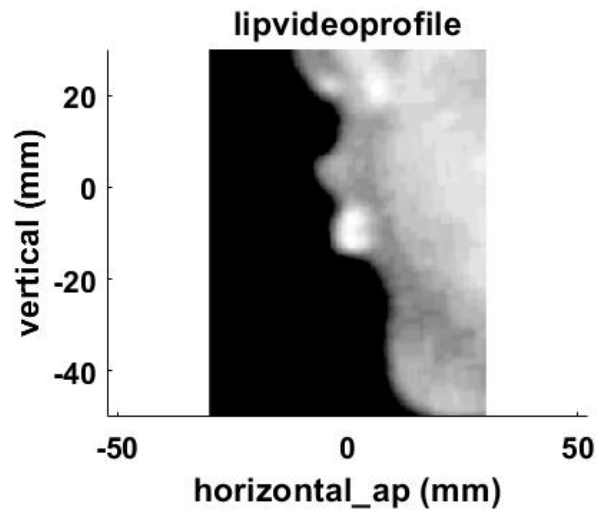
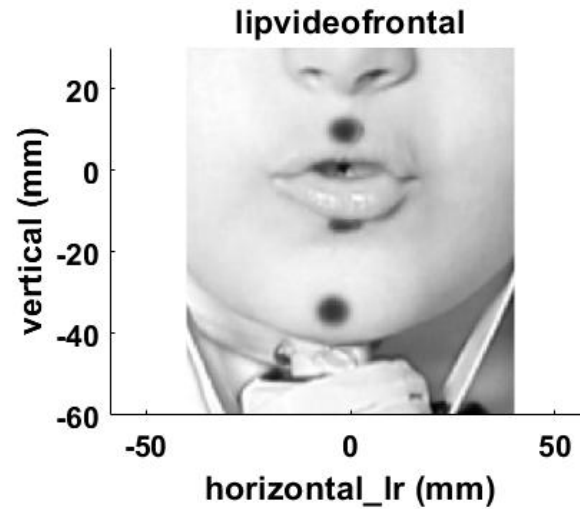
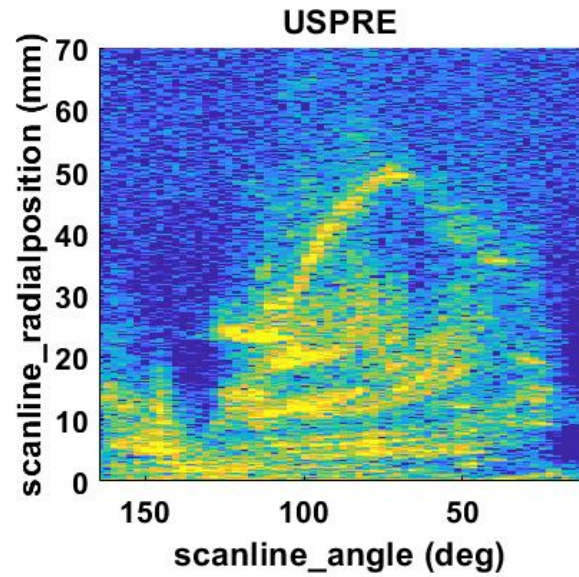


Mid of the fricative
in "Hose"

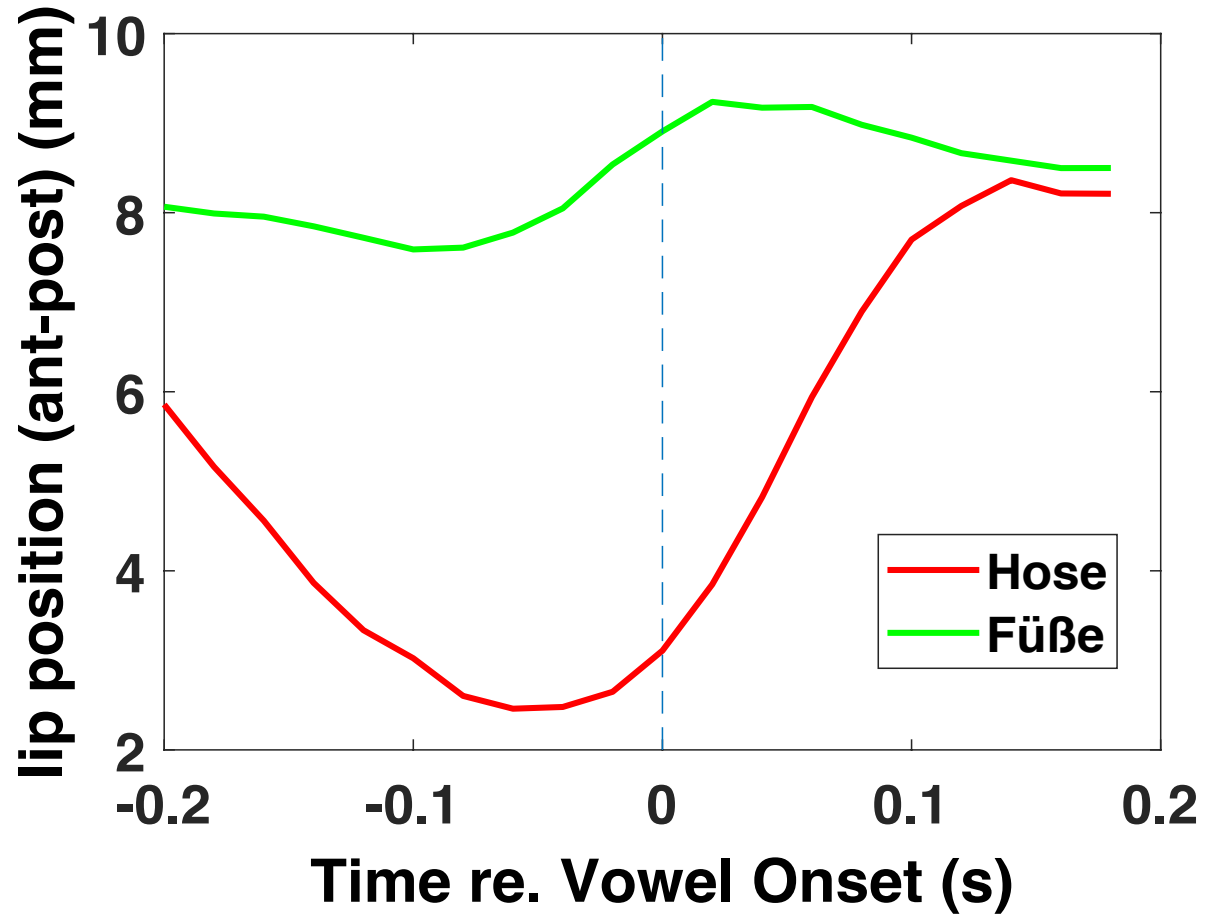


Physiological parameters

Vowel onset of /o/
in "Hose"



Physiological parameters



Comparison “Hose” vs. “Füße” (aggregated across 4 repetitions)

Summary

The children clearly produce Bavarian vowels but they are subtly conditioned by the Standard in the following ways:

- A. The distinction between front/back open vowels /a, ɔ/ (Kabel, Gabel) is less marked for children.
- B. Children make a greater use of quality difference in short vs. long vowels
- C. Children make less use of consonant length in distinguishing short-long vowel pairs