Are neutral roots in Uyghur really neutral? Experimental and structural evidence

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1. Underlying contrasts

Diachronic changes can remove a surface contrast between two phonemes but maintain original phonological behavior

Proto-Inuit > Inuit: */i/ > /i$_1$/; */ə/ > /i$_2$/ (Compton and Dresher 2011)
- In some dialects, /i$_1$/ triggers palatalization, /i$_2$/ does not

How do speakers learn and represent such patterns?

This paper looks at a specific case in Uyghur

2. Uyghur backness harmony

Basic pattern: Suffixes agree in backness with <u>final root vowel</u>

tyr-d**æ**/*-d**ɑ**	'type-LOC'	pul-**ʁɑ**/*-**gæ**	'money-DAT'
munb**æ**r-**gæ**/*-**ʁɑ**	'podium-DAT'	ætrɑp-t**ɑ**/*-t**æ**	'area-LOC'

The vowel /i/ is *transparent*

mæsʧit-t**æ** /*-t**ɑ**	'mosque-LOC'	tɑksi-l**ɑr**/*-l**ær**	'taxi-PL'
mømin-**gæ**/*-**ʁɑ**	'believer-DAT'	ɑmil-**ʁɑ**/*-**gæ**	'element-DAT'

Neutral roots with only transparent vowels vary in suffix backness

biz-**gæ**/*-**ʁɑ**	'us-DAT'	sir-l**ɑr**/-*l**ær**	'secret-PL'
ilim-**gæ**/*-**ʁɑ**	'knowledge-DAT'	sinip-t**ɑ**/-*t**æ**	'classroom-LOC'

Modern /i/ corresponds to historic */i/ and */ɯ/ (Erdal 2004)
- Roots often preserve historical behavior
- Drift towards back suffixes for less frequent words (Lindblad 1990)

3. Representing neutral roots

Covert contrast analysis (Lindblad 1990, Hahn 1991)

UR	/sɯr-lAr/	/biz-DA/
Harmony	sɯr-lɑr	biz-dæ
Fronting	sir-lɑr	--
SR	[sirlɑr]	[bizdæ]

Lexical diacritic analysis (Mayer 2021)

UR	/sir$_{+back}$-lAr/	/biz$_{-back}$-DA/
Harmony	sir$_{+back}$-lɑr	biz$_{-back}$-dæ
SR	[sirlɑr]	[bizdæ]

<u>Can we differentiate between these two analyses?</u>

Hungarian VH has similar neutral roots
- Tongue backness in unsuffixed neutral roots is predicted by the backness of the suffixes they take (Benus and Gafos 2007)
- Phonetic contrast suggests phonemic contrast?

<u>Can we find similar evidence in Uyghur?</u>

This study argues <u>against</u> a covert phonemic contrast in Uyghur on the basis of a lack of acoustic and structural evidence

We propose that this behavior should be accounted for by lexical specification of root behavior

4. Experimental study

Participants: 23 native Uyghur speakers living in Almaty, KZ

Stimuli: 29 neutral roots elicited in unsuffixed and suffixed (LOC) form

Carrier phrase: *Mahinur _____ deydu*
Mahinur will say _____

Vowels segmented by hand, F2 extracted at vowel midpoint

5. Analysis of vowels in unsuffixed tokens

Fit linear-mixed effects model to data (refer to proceedings paper for detail about model)
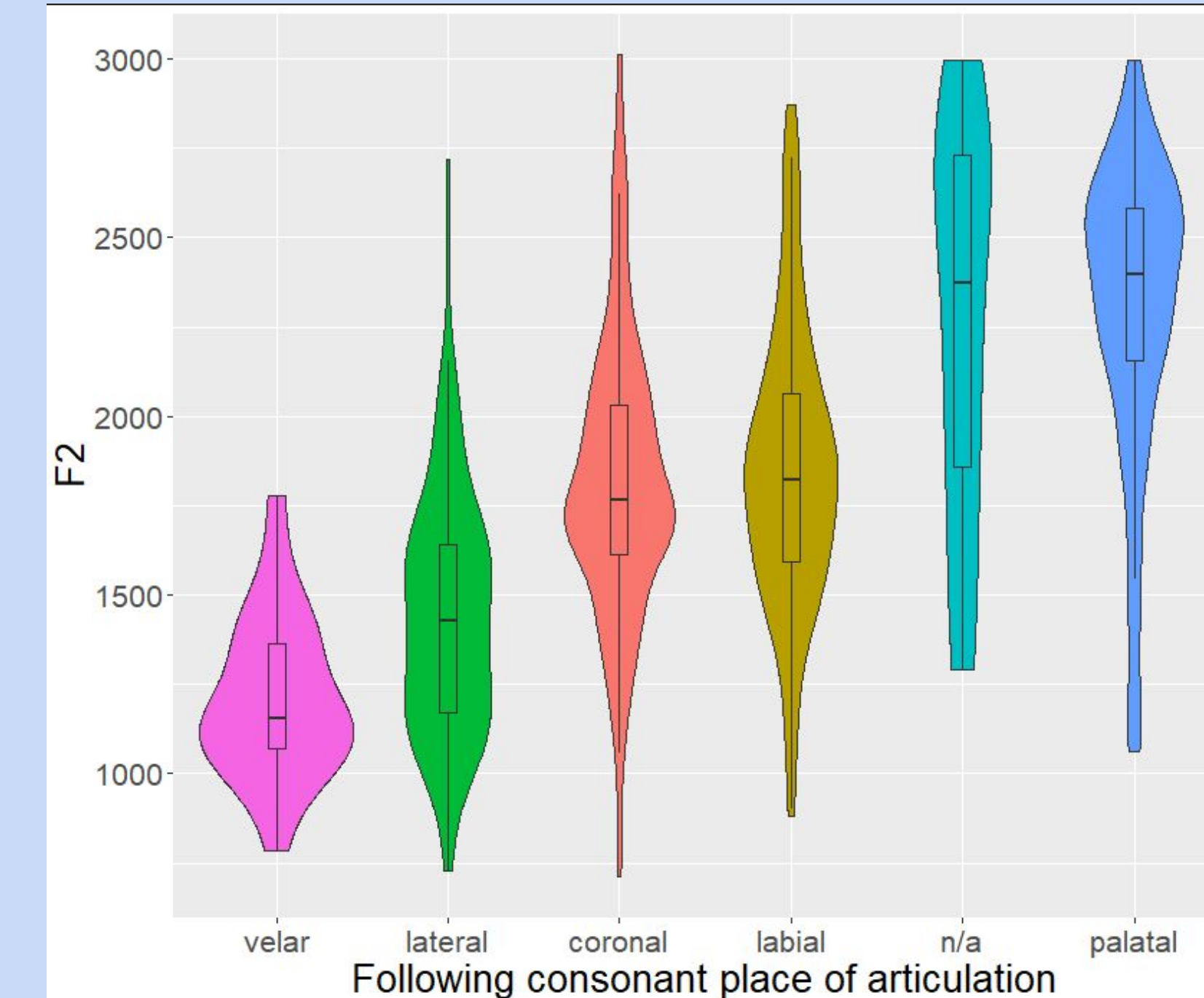
Dependent variable	**Predictors**	**Random intercepts**
F2 of final vowel	Suffix choice (F or B) Gender Place of following C	Speaker Root

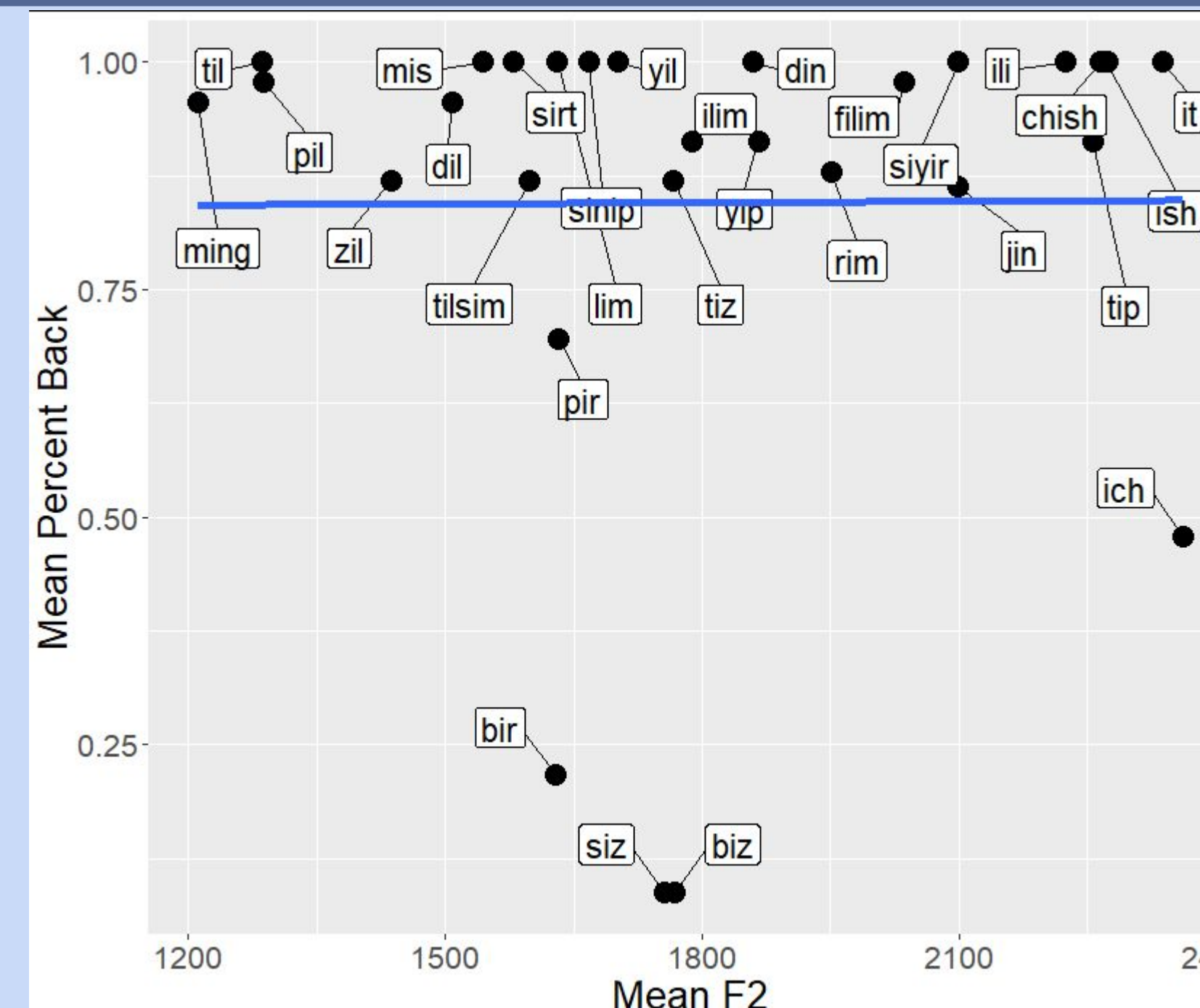**Place of following C predicts F2**

velar, lateral
<
coronal, labial
<
n/a, palatal
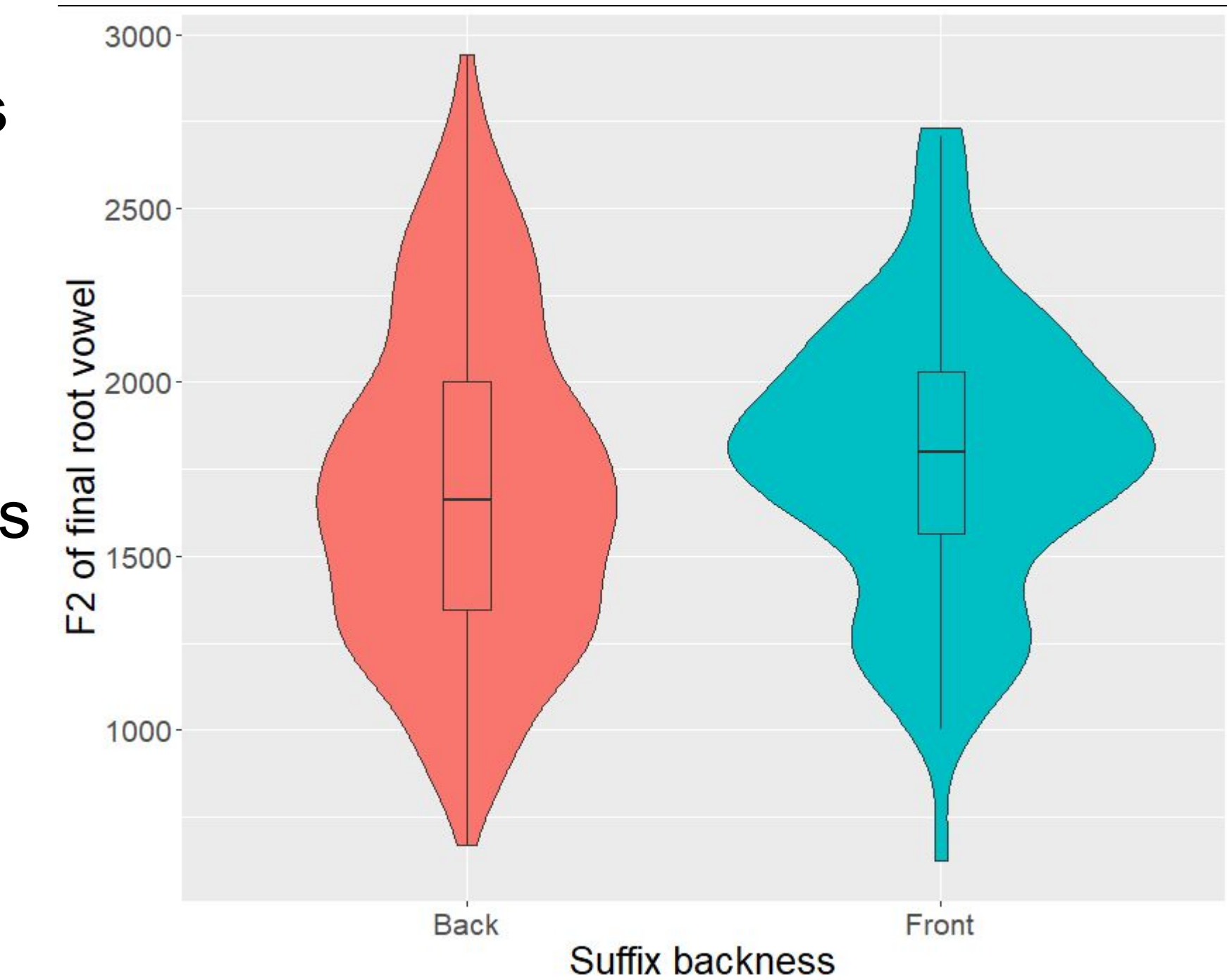

Suffix choice <u>does not</u> predict F2

The variation observed in F2 between roots cannot be attributed to their harmonic behavior.

6. Analysis of vowels in suffixed tokens

Suffix choice does not predict F2 in suffixed forms

No significant co-articulatory effects between suffix and preceding neutral vowel

7. Structural considerations

No minimal pairs exist between /i/ and /ɯ/
- i.e. no pairs like hypothetical */sɯp/ vs. */sip/

The /i/~/ɯ/ distinction has a functional load of 0
- Neutralizing contrast does not increase ambiguity (entropy)

Phonemic contrasts with a functional load of 0 can be learned based on phonetic dissimilarity (e.g. Peperkamp et al. 2006)
- E.g., /ŋ/~/h/ in English
- /i/ and /ɯ/ are not phonetically dissimilar

Stuctural evidence **does not support a phonemic contrast**

8. Discussion

<u>**No acoustic or structural evidence**</u> supports <u>**underlying contrast**</u> between /i/ and /ɯ/
- Corroborates later work on Hungarian (Blaho and Szeredi 2013) and smaller study on Uyghur (McCollum 2021)

<u>**Lexical diacritics**</u> are a simpler analysis (Mayer 2021)
- Unifies neutral roots with other exceptional roots
- Speakers learn front neutral roots as exceptions

Both analyses are **descriptively adequate** (Chomsky 1956)
- We should strive for **explanatory adequacy**
- Bring additional data to bear on analyses
- Consider learnability!

Selected References

Benus S and Gafos AI (2007). Articulatory characteristics of Hungarian 'transparent' vowels. *J. Phon.* 35(3), 271-300. **Chomsky N** (1965). *Aspects of the theory of syntax.* Cambridge, MA: MIT Press. **Compton R and Dresher BE** (2007). Palatalization and "strong i" across Inuit dialects. *CJL* 56(2), 203-228. **Erdal M** (2004). *A grammar of Old Turkic.* Leiden: Brill. **Hahn R** (1991). *Spoken Uyghur.* Seattle: UW Press. **Lindblad VM** (1990). *Neutralization in Uyghur.* MA thesis, UW. **Mayer C** (2021). *Issues in Uyghur backness harmony.* PhD thesis, UCLA. **Peperkamp S et al.** (2006). The acquisition of allophonic rules. *Cognition 101,* B31-41.