

RUTGERS

School of Arts and Sciences

Does Gujarati Stress Avoid the Lowest Sonority Vowel [ə]?

Shu-hao Shih

Rutgers University

shuhao.shih@rutgers.edu

CUNY 2016, 14 January 2016

Intro

- What is sonority-driven stress?
 - [aw:áɲã] ‘coming’
 - [kójəldi] ‘little cuckoo’ (de Lacy 2002)
- Universal sonority hierarchy (Kenstowicz 1997, de Lacy 2004)
 - 'a' > 'e, o' > 'i, u' > 'ə' > 'ɨ'

Broad Proposal

- There is no sonority-driven stress
 - Contra Kenstowicz 1994, de Lacy 2002 et seq. and many others
- Reports are due to misperception
 - Attending to the wrong or missing acoustic cues

Narrow Proposal

- Stress in Gujarati
 - No sonority-driven stress
 - falls on the penultimate position.
- Misperception of stress position due to stressless schwa syndrome.

Why choose Gujarati? (Part 1)

- de Lacy (2002) says...

- [a] attracts stress

[sáɖa] 'plus 1/2'

[fikár] 'recently'

- [ə] repels stress

[aw:ánã] 'coming'

[kójəldi] 'little cuckoo'

Descriptions

- Evidence for stress in Gujarati
 - Longer duration (Adenwala 1968, Modi 2013)
 - Higher intensity: [a] (Patel & Mody 1960)
 - Allophony: [ə] ~ [ʌ] (Patel & Mody 1960, Lambert 1971, Nair 1979)
- Impressionistic descriptions

Why choose Gujarati? (Part 2)

- The most *described* case
 - Cardona (1965), Adenwala (1968), Mistry (1997), de Lacy (2002), Cardona & Suthar (2003), Doctor (2004), Schiering & van der Hulst (2010), Modi (2013)
- A three-way sonority distinction is rare
- Complex interaction with foot structure
- If Gujarati is wrong, then it casts doubt on other less well described cases

Why should you care?

- Theoretical
 - Problem of symmetric response in OT
- Methodological
 - Casts doubt on impressionistic stress descriptions
 - They tell us about the authors' perceptual systems
 - Not about the target language

Part 1

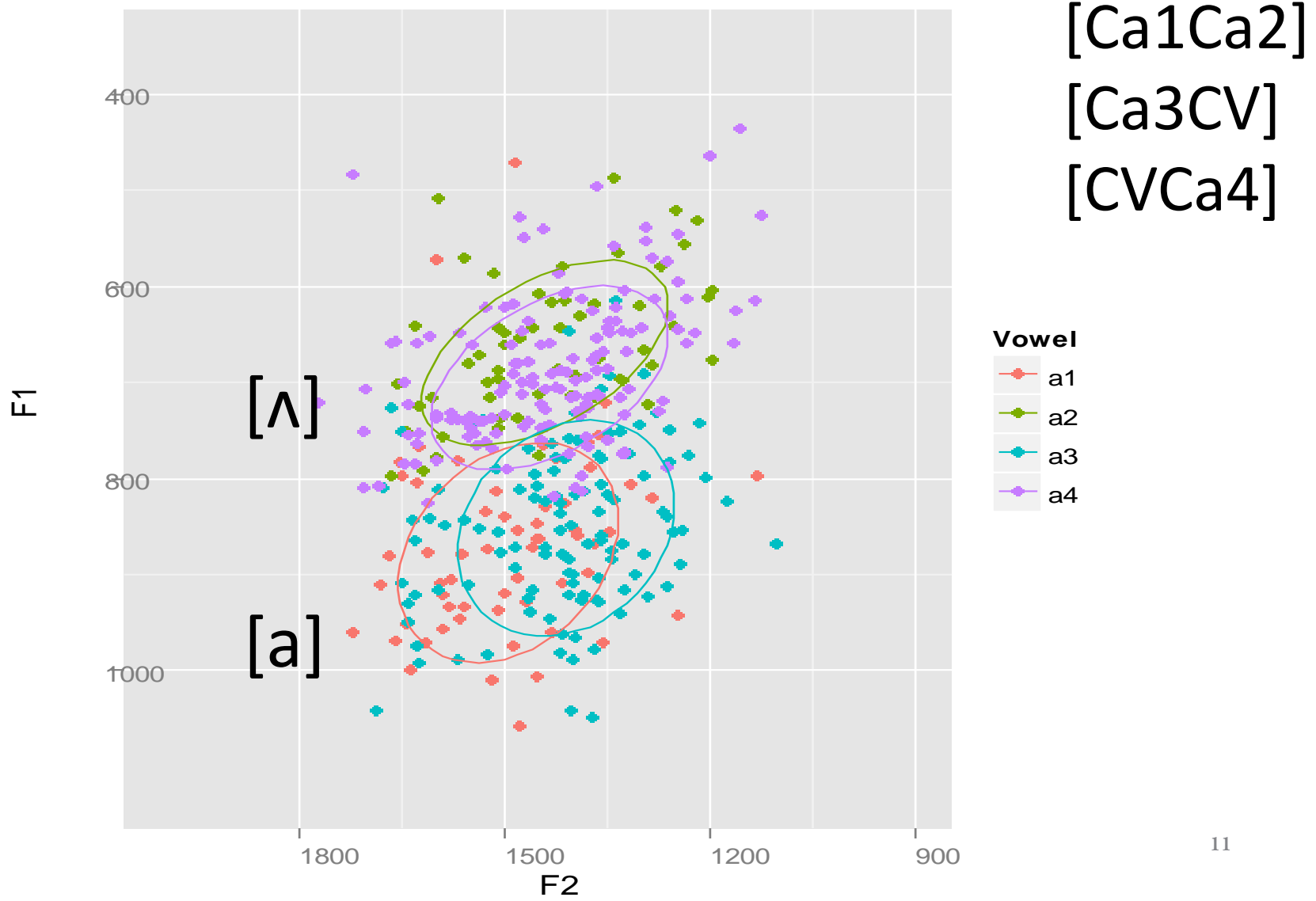
[a] does ***not*** attract stress

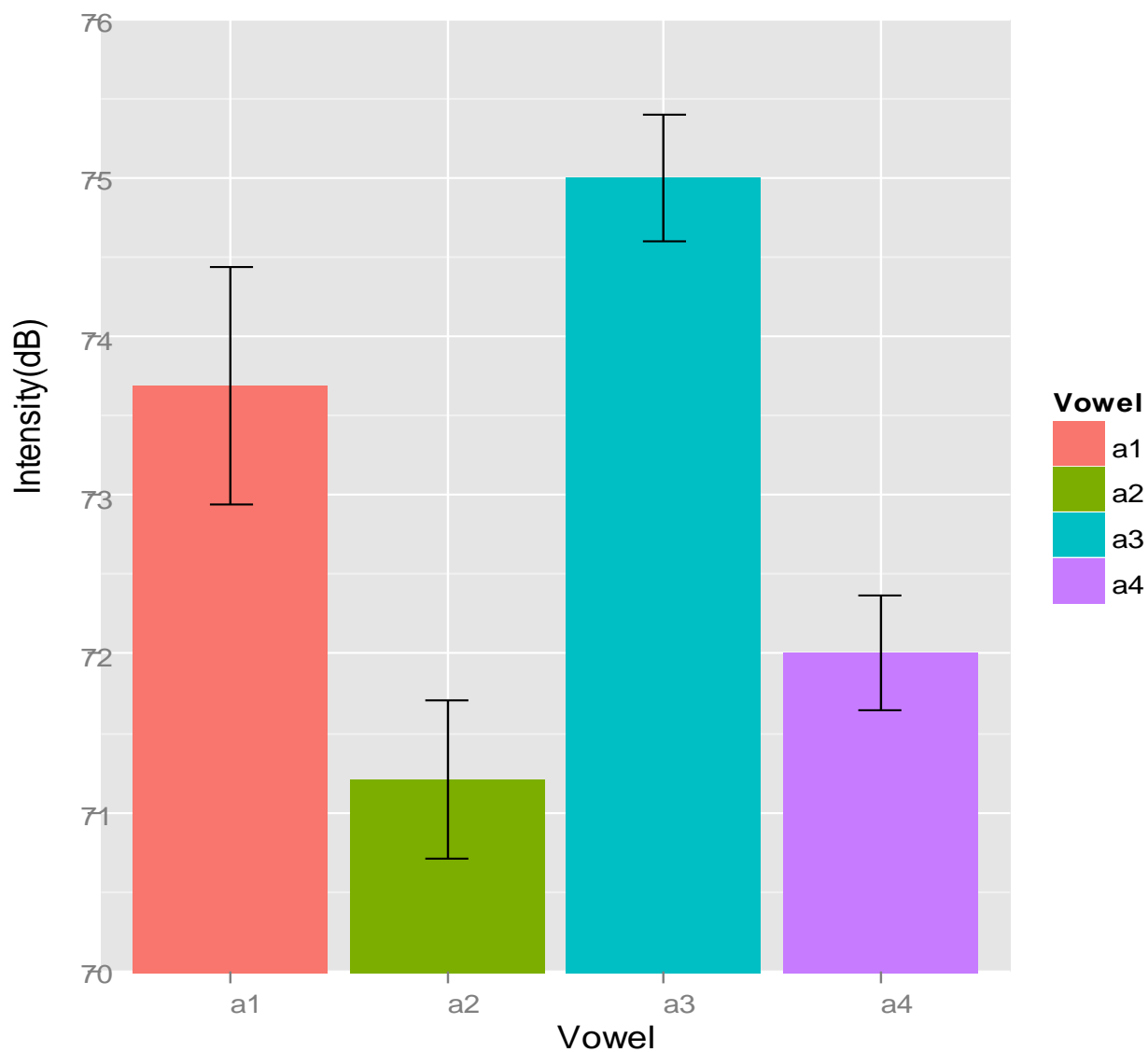
In

Gujarati

Stress falls on the penult

- [a] is reported to attract stress.
 - [sáɖa] 'plus 1/2'
 - [ʃikár] 'recently' (de Lacy 2002)
- Stress falls on the penultimate position.
 - Vowel quality, intensity, and duration





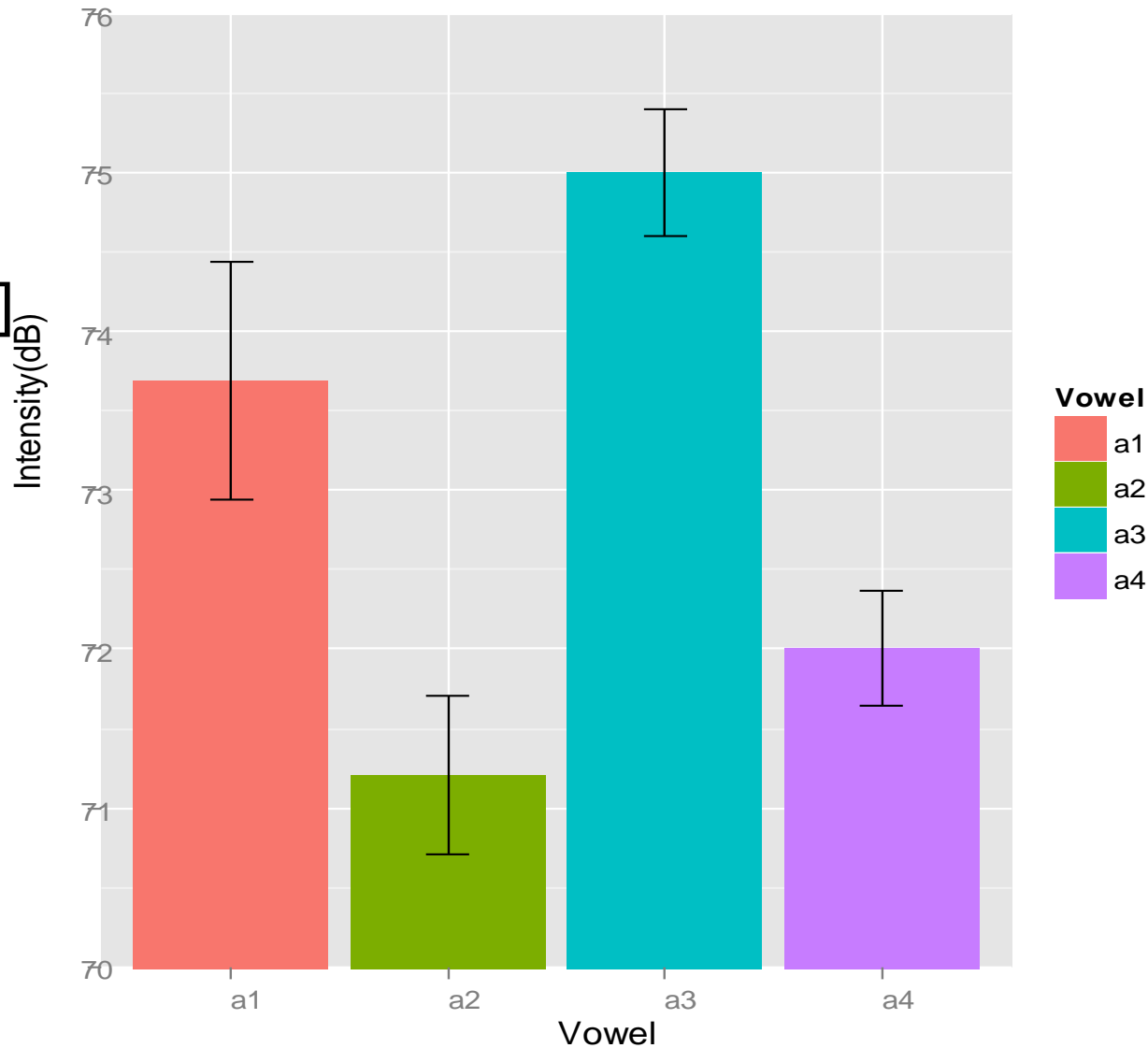
[Ca1Ca2]
[Ca3CV]
[CVCa4]

Vowel
a1
a2
a3
a4

[Ca1Ca2]
[Ca3CV]
[CVCa4]

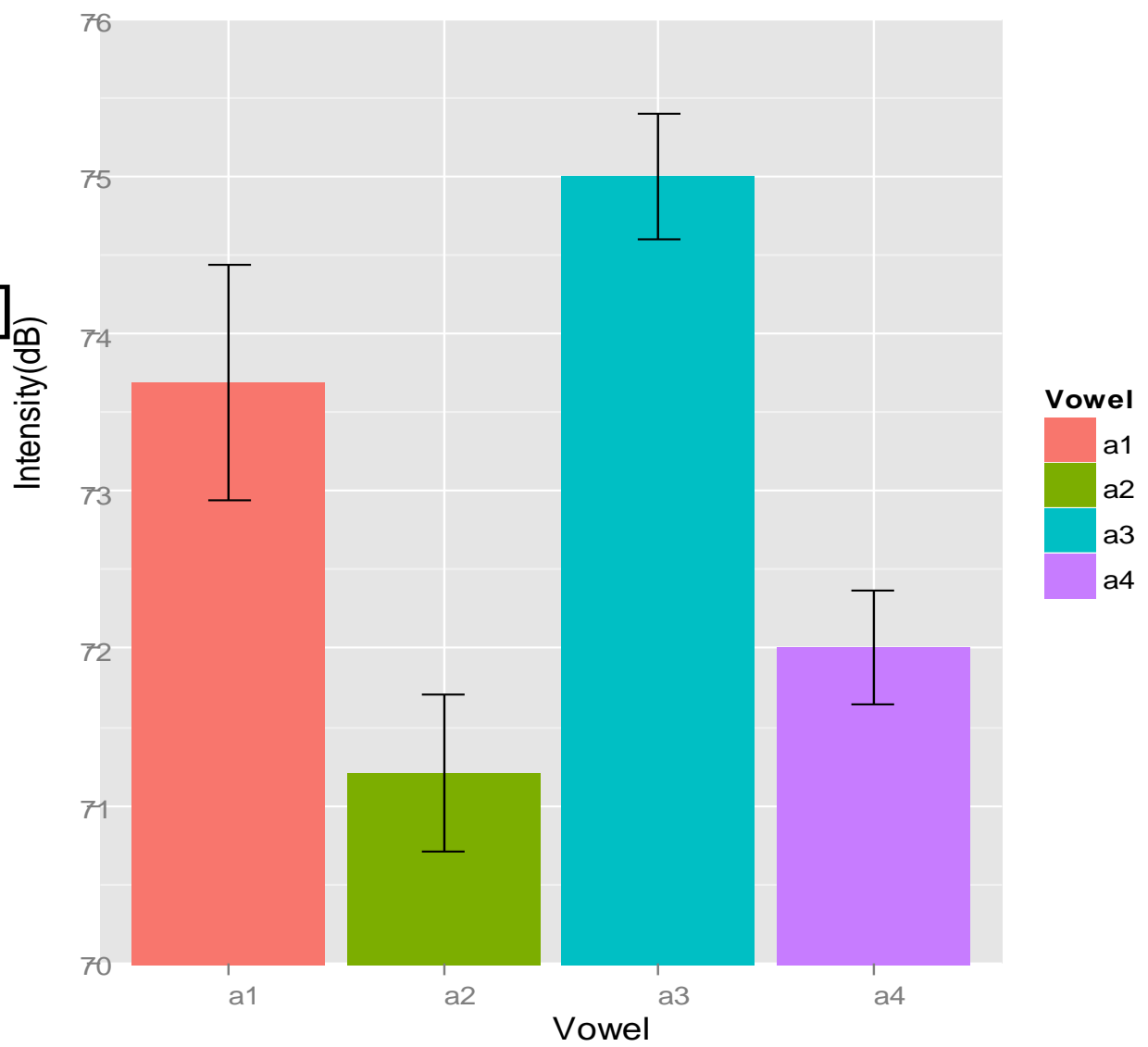
[a4] vs. [a1]

$p=0.0105$



[Ca1Ca2]
[Ca3CV]
[CVCa4]

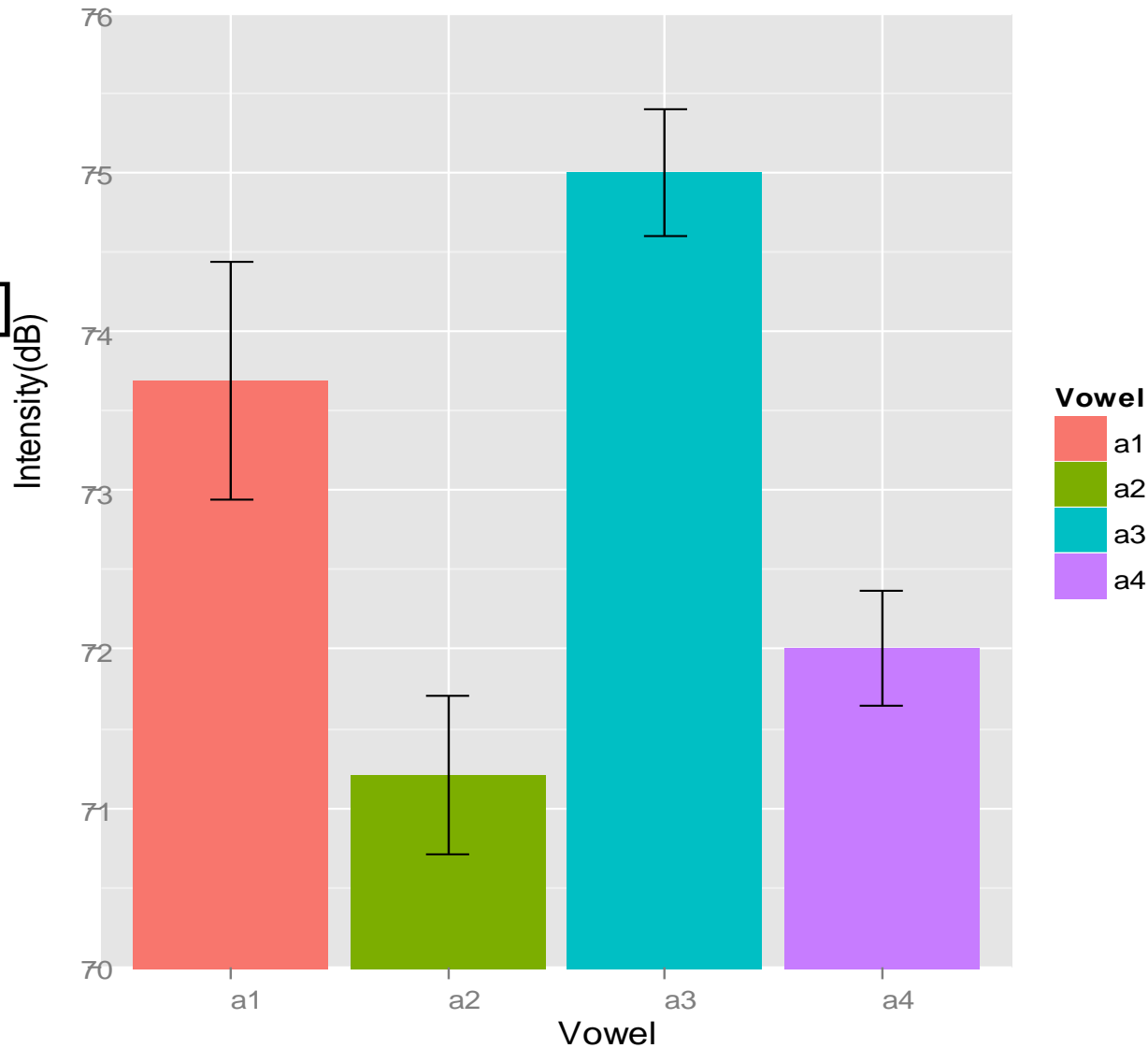
[a4] vs. [a3]
 $p < 0.001$



[Ca1Ca2]
[Ca3CV]
[CVCa4]

[a4] vs. [a2]

p=0.382



Part 2

[ə] does ***not*** repel stress
in
Gujarati

Experiment: [ə]

- Design

- 4 male and 1 female (22-24 years old)
- [Cə.CəC.CV], [Cu.CəC.CV], [Cu.CuC.CV]
- C = [p t k]
- Two frame sentences
- Duration, F0, F1, F2, and intensity

Experiment: [ə]

- **Two** frame sentences

(a) [tame a jabdə ne _____ kaho tʃ^ho]

you this word to read tense-present

"You read this word _____."

(b) [a jabdə _____ k^harek^har mastə tʃ^he]

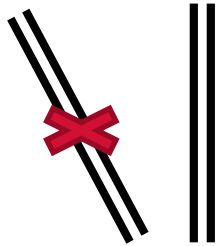
this word really interesting is

"This word _____ is really interesting."

Predictions

a. Penult Hypothesis

[Cə¹.Cə²C.CV]



[Cu.Cə³C.CV]

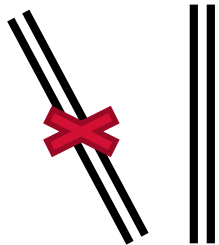
[ə²] = [ə³]

[ə²] & [ə³] ≠ [ə¹]

Predictions

a. Penult Hypothesis

[Cə¹.Cə²C.CV]



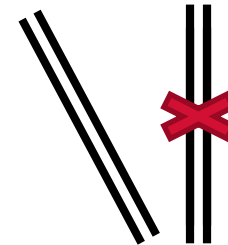
[C_u.Cə³C.CV]

[ə²] = [ə³]

[ə²] & [ə³] ≠ [ə¹]

b. Sonority Hypothesis

[Cə¹.Cə²C.CV]



[C_u.Cə³C.CV]

[ə¹] = [ə³]

[ə¹] & [ə³] ≠ [ə²]

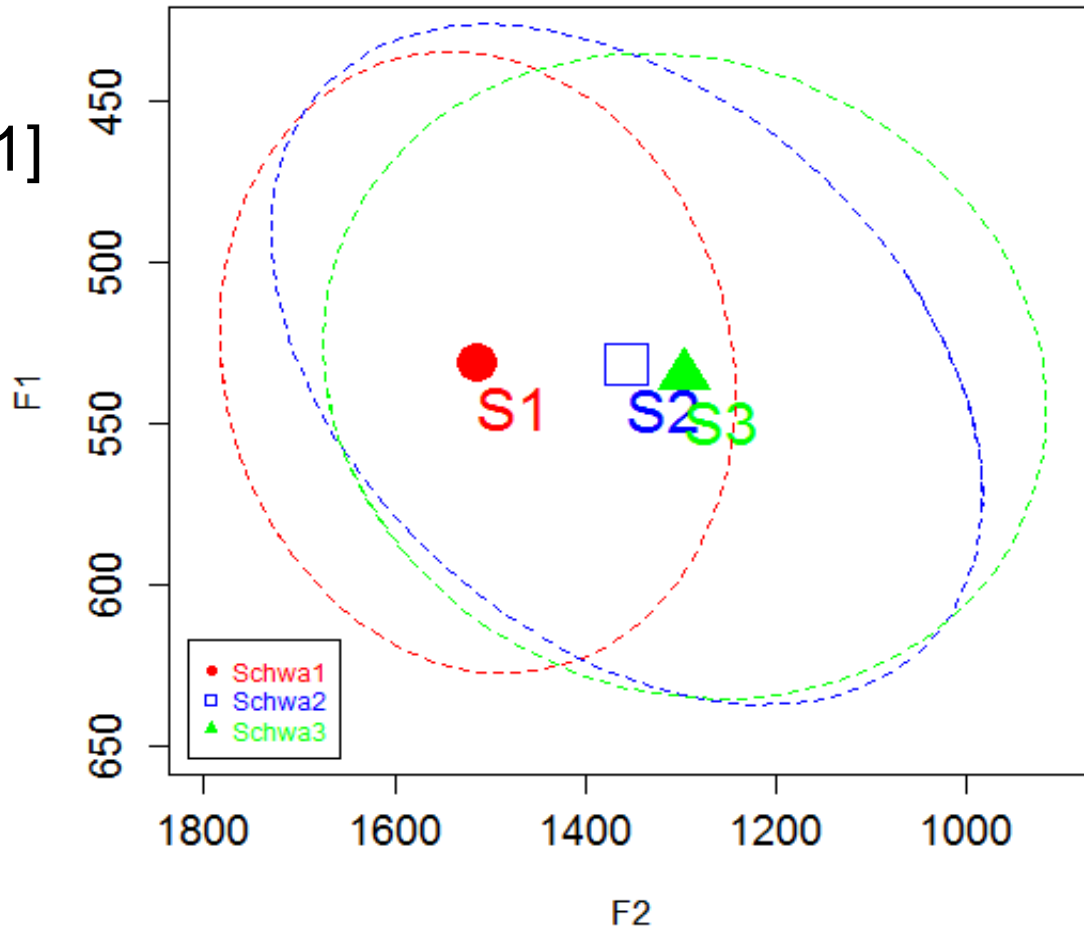
Uncorrected [ə] distribution

[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ə3] vs. [ə1]

p < 0.01



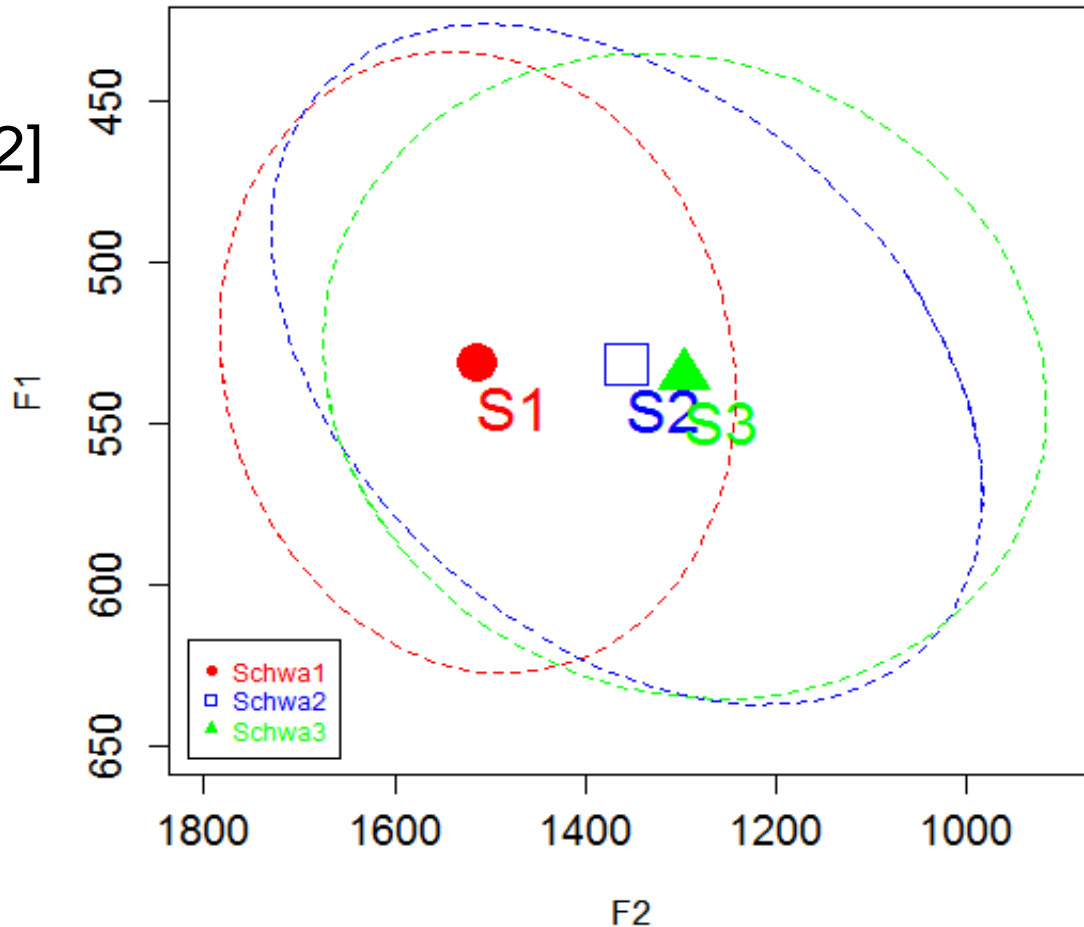
Uncorrected [ə] distribution

[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ə3] vs. [ə2]

$p < 0.01$



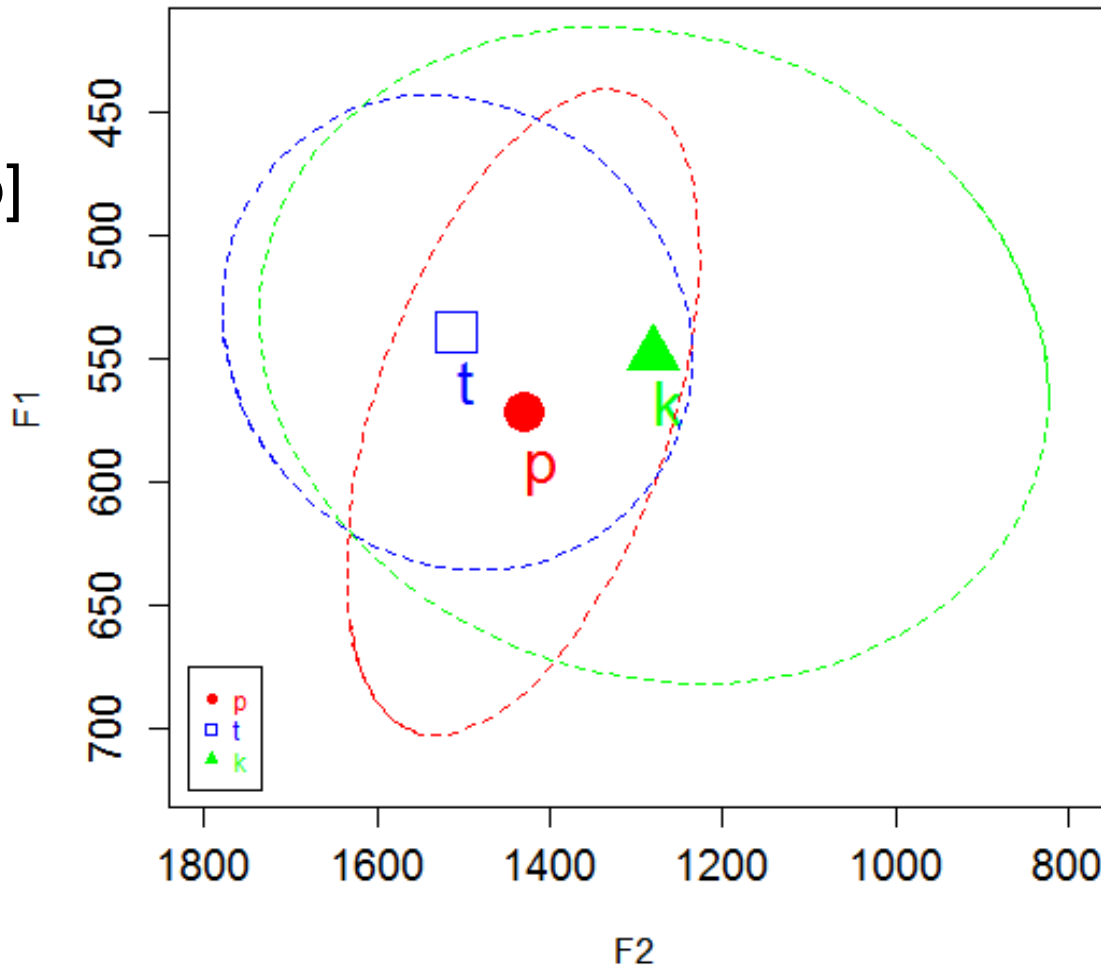
[ə] followed by [p t k]

[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ək] vs. [əp]

$p < 0.001$



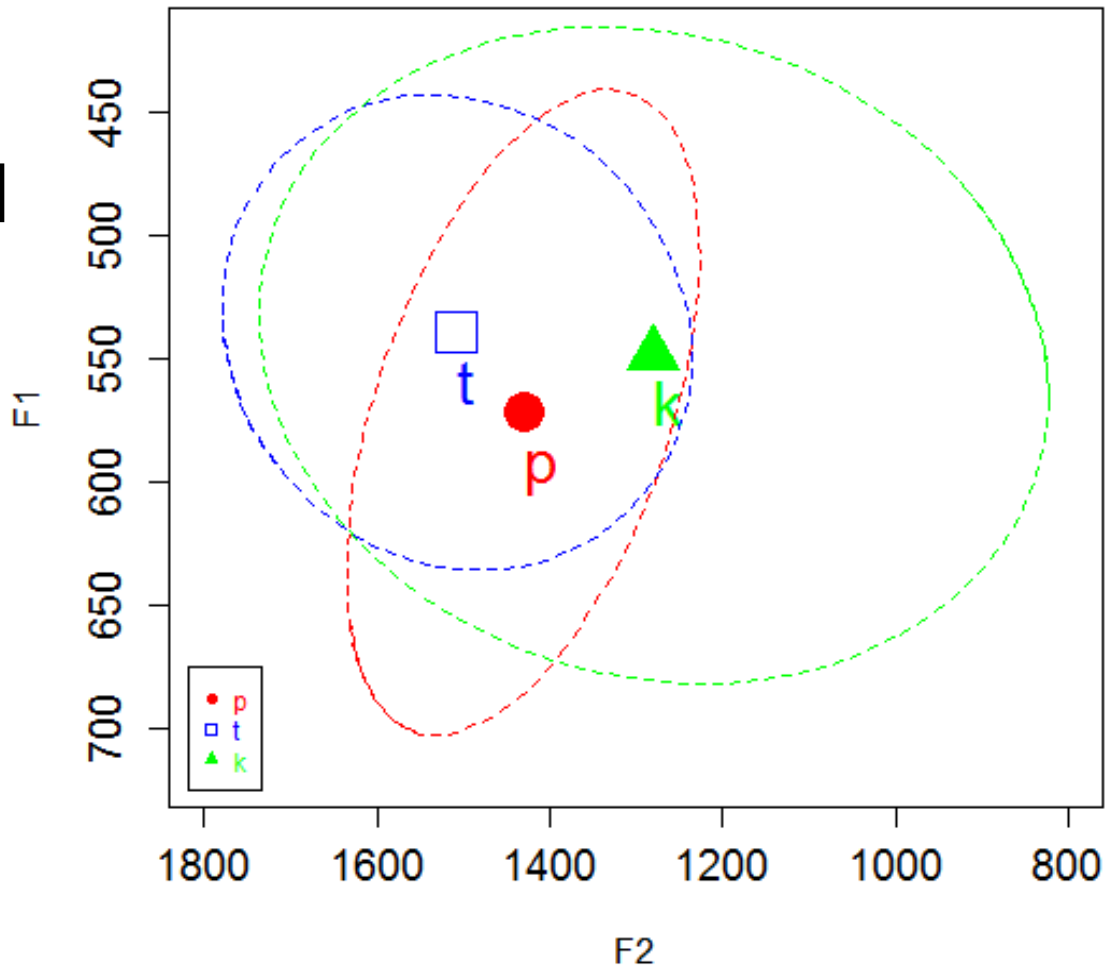
[ə] followed by [p t k]

[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ət] vs. [əp]

p=0.0158



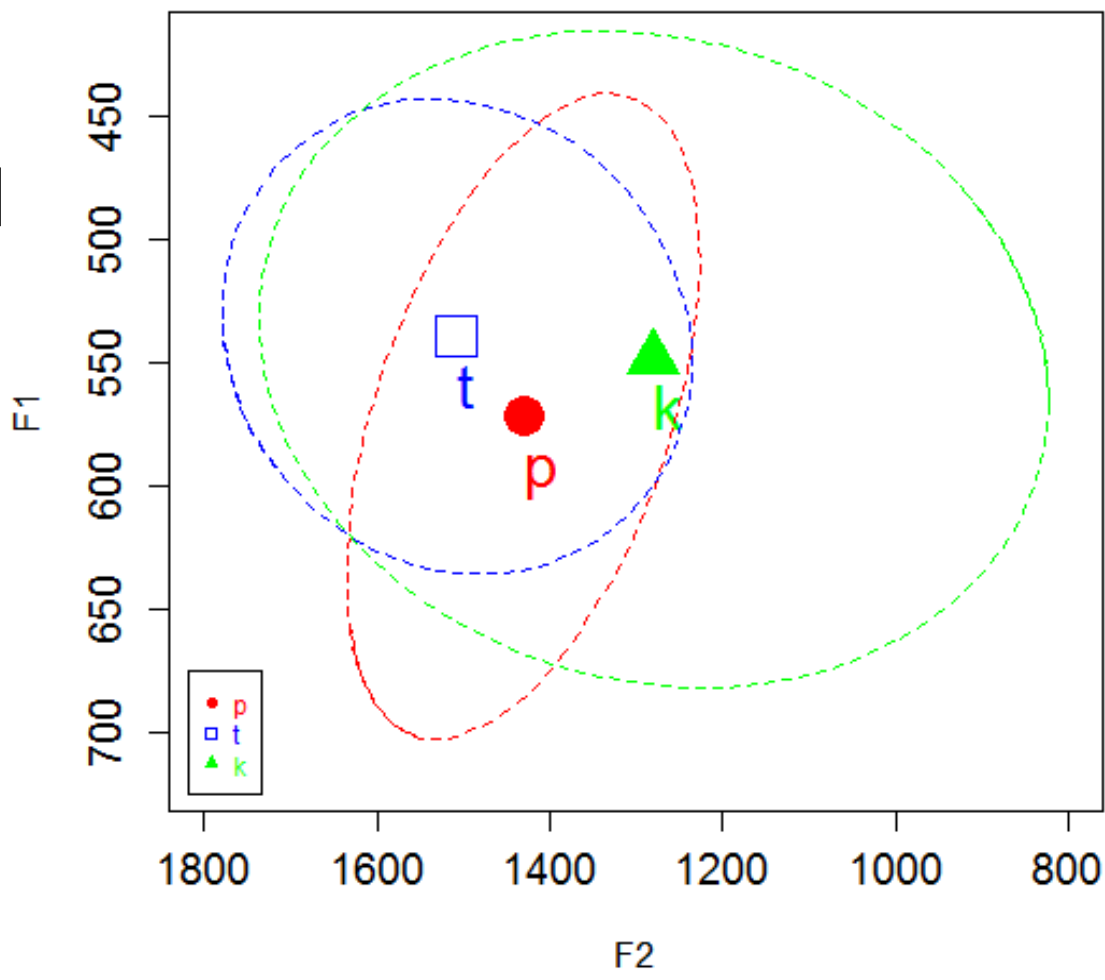
[ə] followed by [p t k]

[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ət] vs. [ək]

p < 0.001

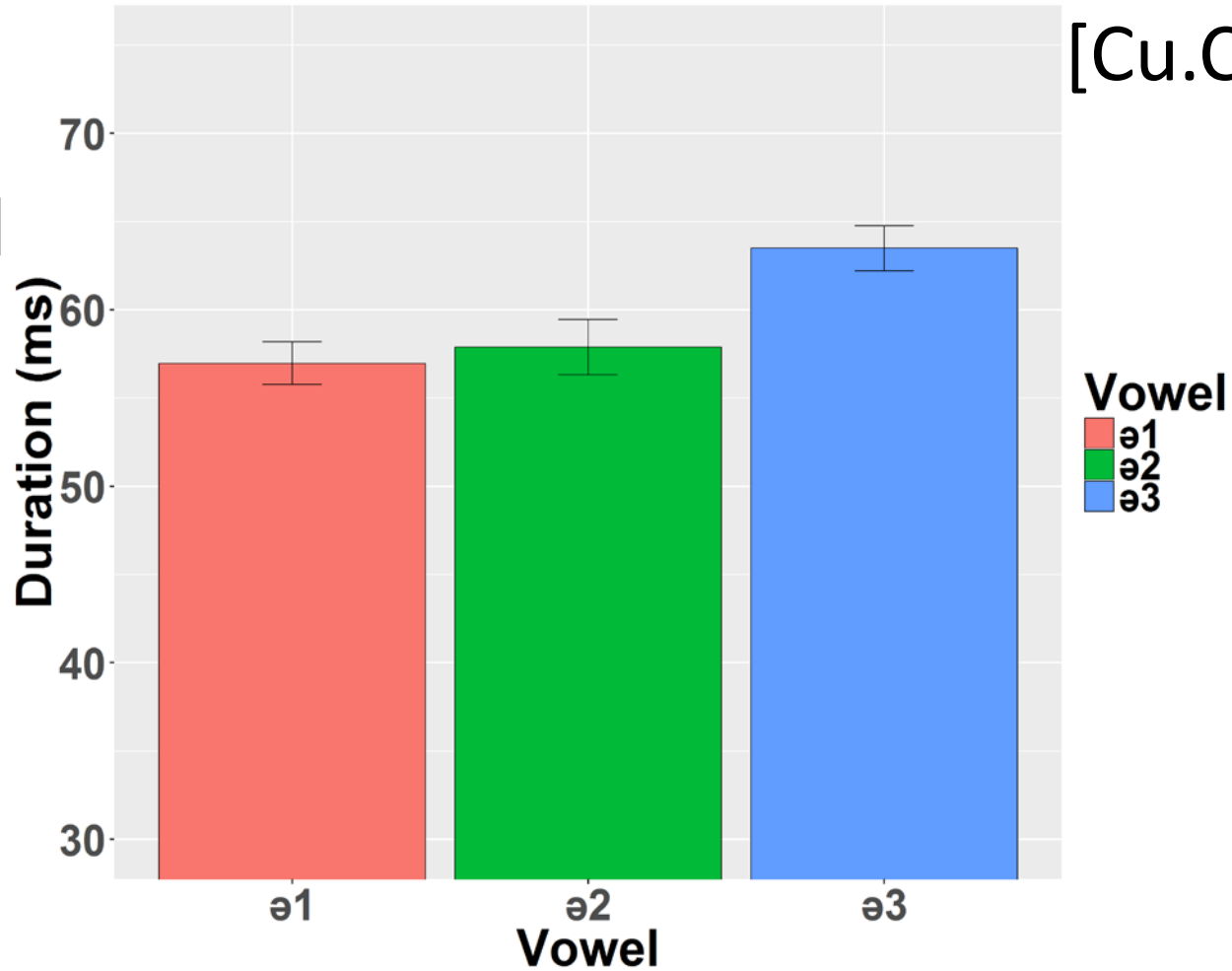


[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ə1] vs. [ə2]

p=0.659

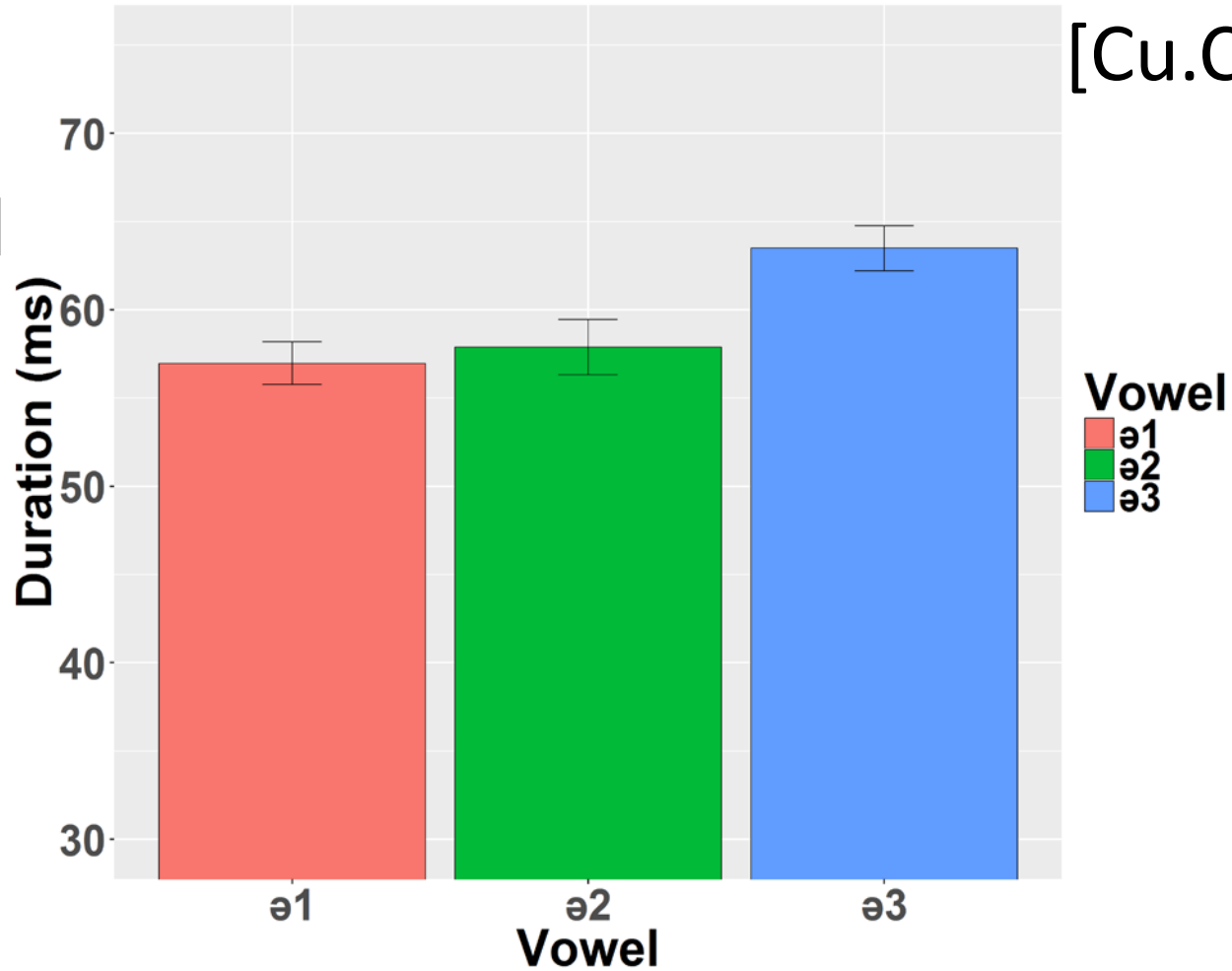


[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ə3] vs. [ə1]

p < 0.001

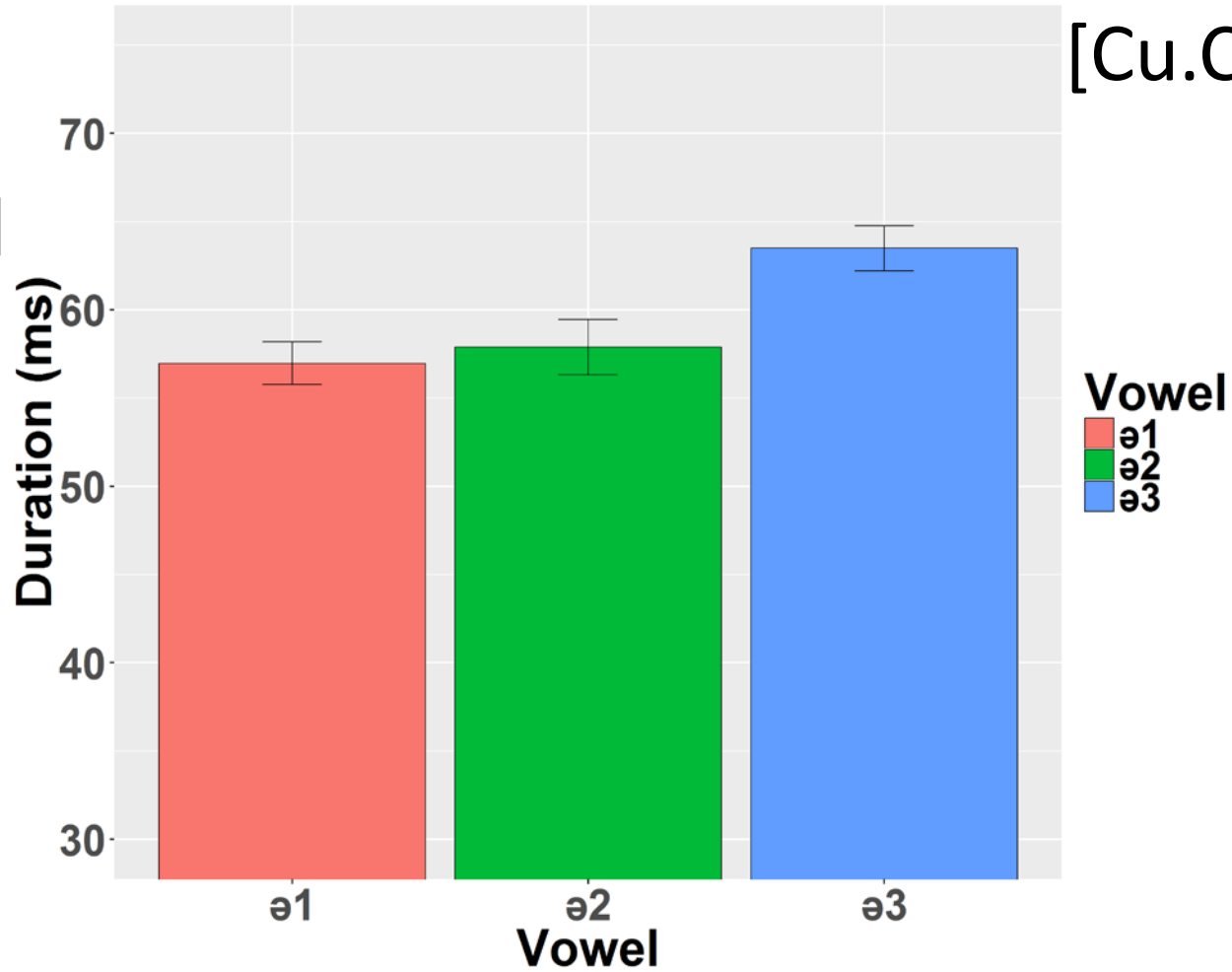


[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ə3] vs. [ə2]

p < 0.001

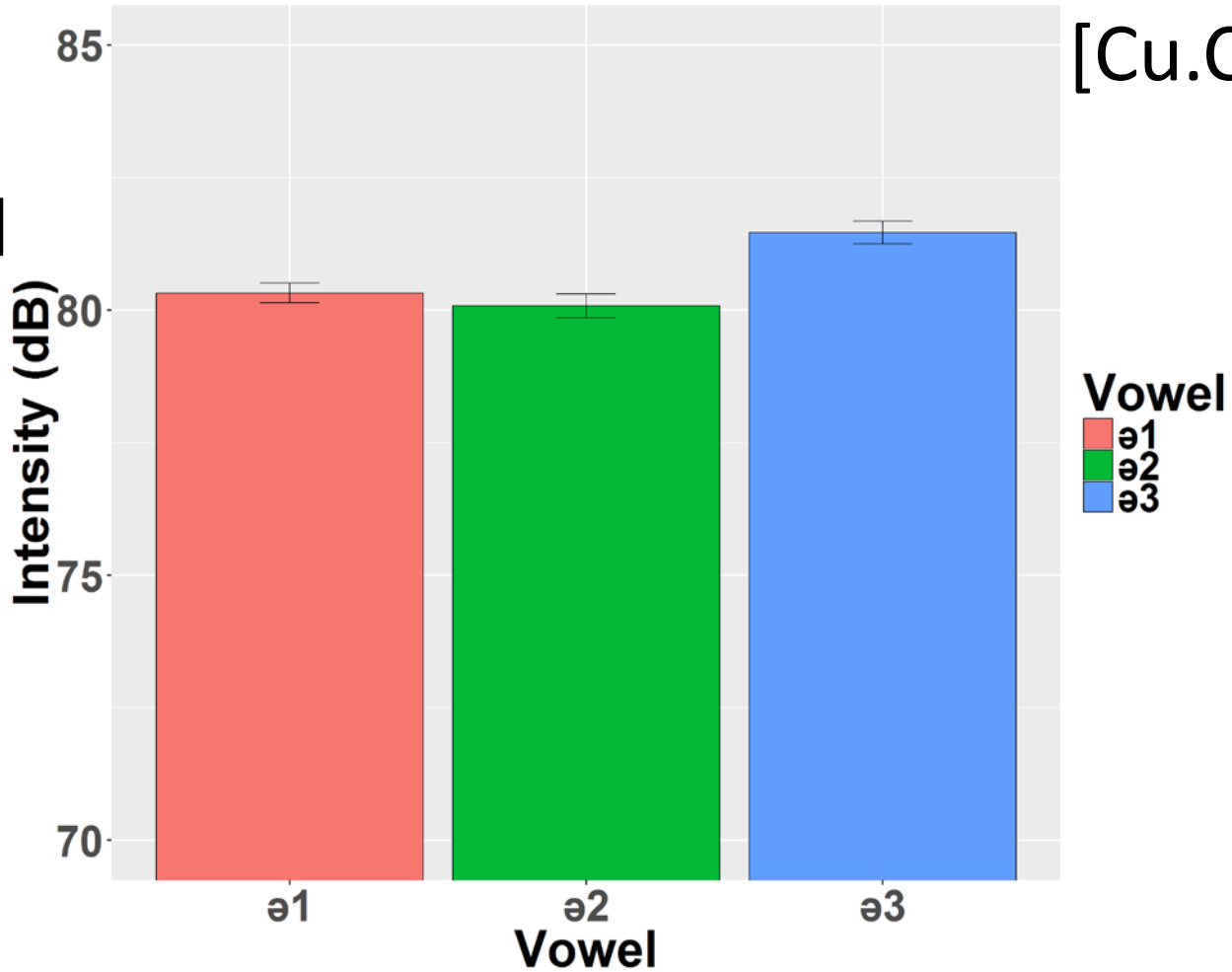


[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

[ə1] vs. [ə2]

p=0.190

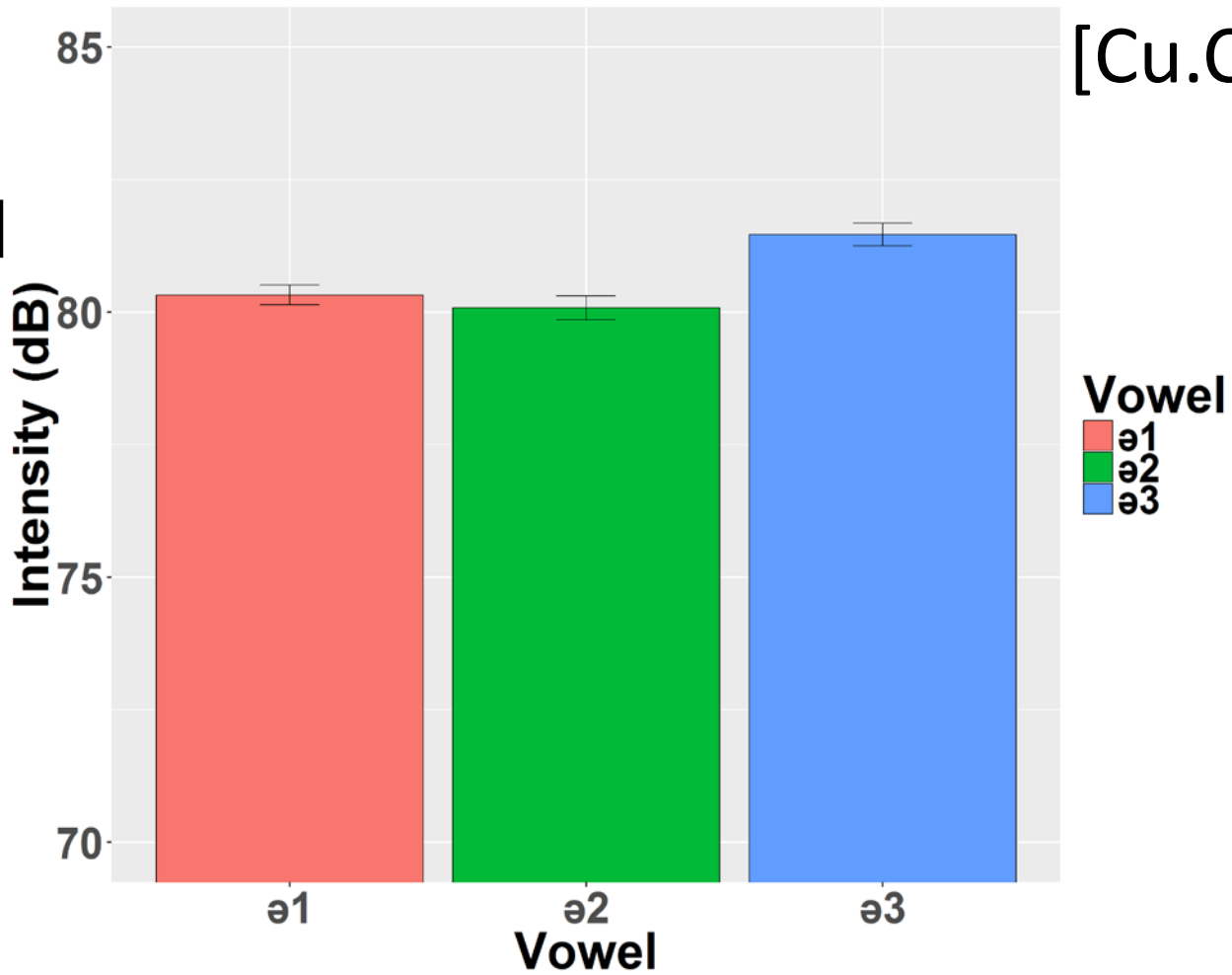


[Cə1.Cə2C.CV]

[Cu.Cə3C.CV]

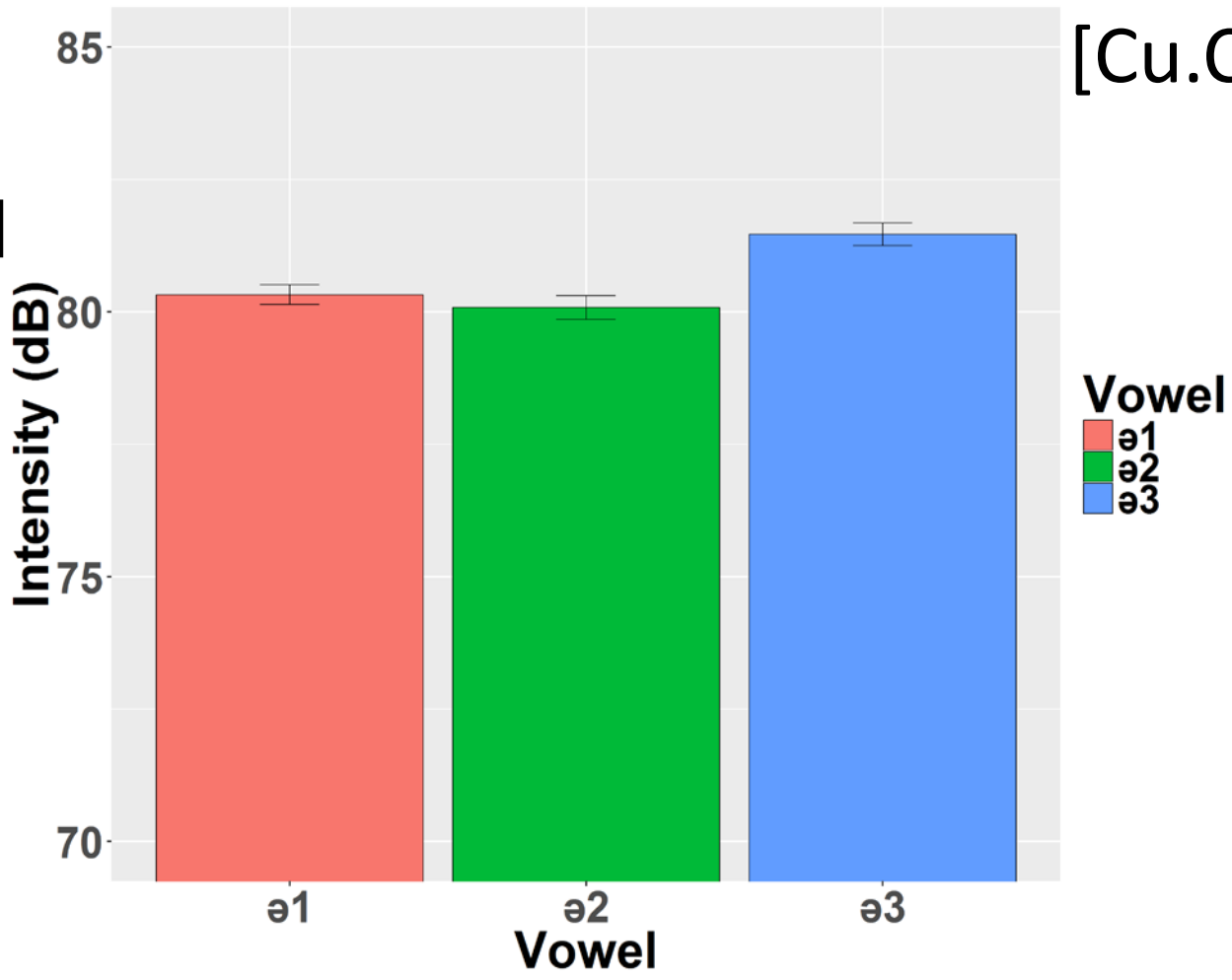
[ə3] vs. [ə1]

$p < 0.001$

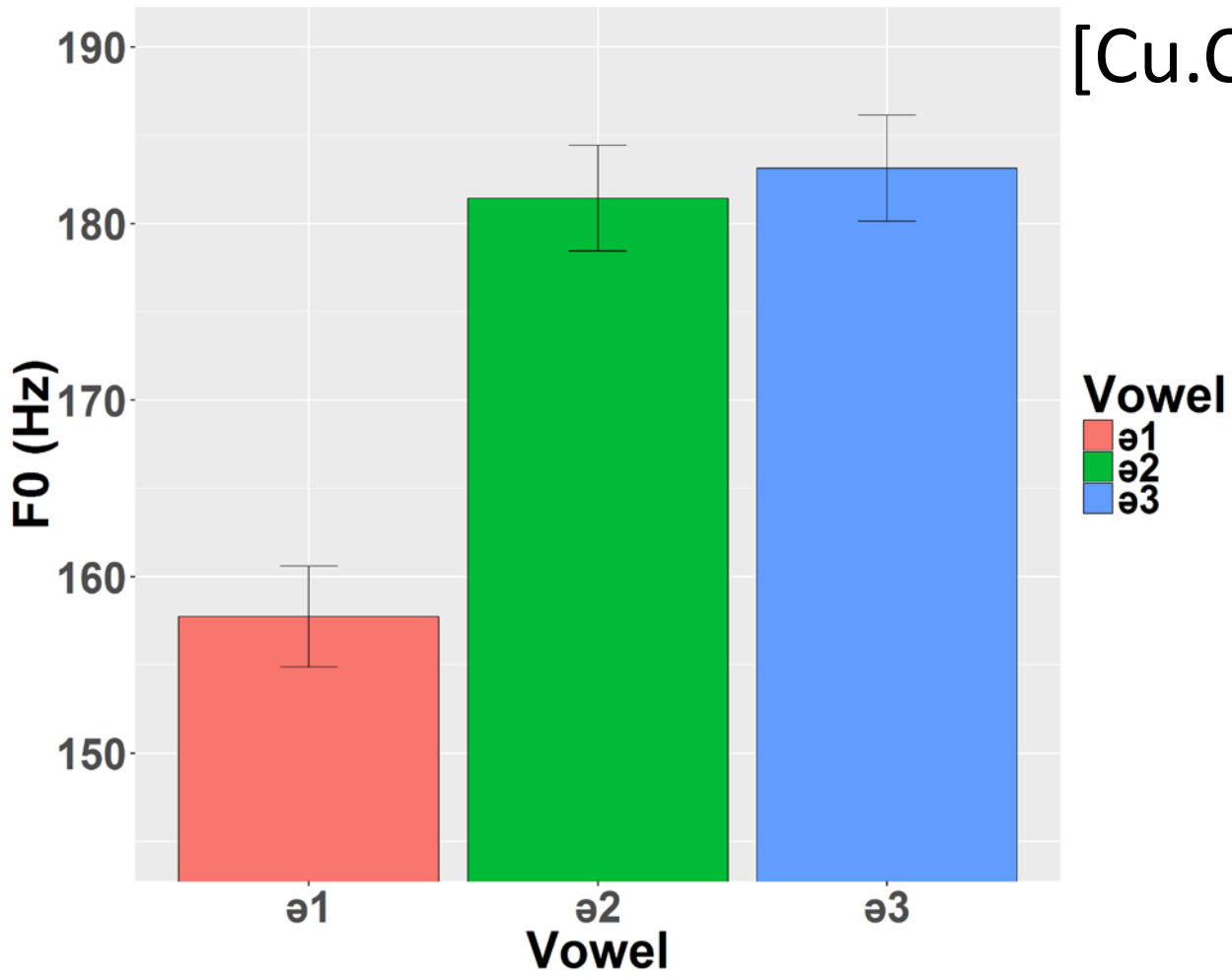


[Cə1.Cə2C.CV]
[Cu.Cə3C.CV]

[ə3] vs. [ə2]
p<0.001



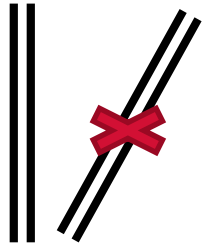
[Cə1.Cə2C.CV]
[Cu.Cə3C.CV]



Predictions

a. Penult Hypothesis

[Cu1.Cú2C.CV]



[Cu3.CéC.CV]

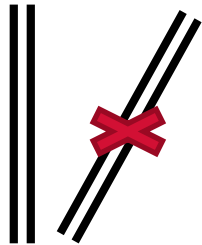
[u1] = [u3]

[u1] & [u3] ≠ [u2]

Predictions

a. Penult Hypothesis

[Cu1.Cú2C.CV]



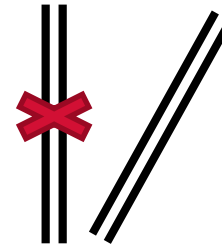
[Cu3.CəC.CV]

[u1] = [u3]

[u1] & [u3] ≠ [u2]

b. Sonority Hypothesis

[Cu1.Cú2C.CV]



[Cú3.CəC.CV]

[u2] = [u3]

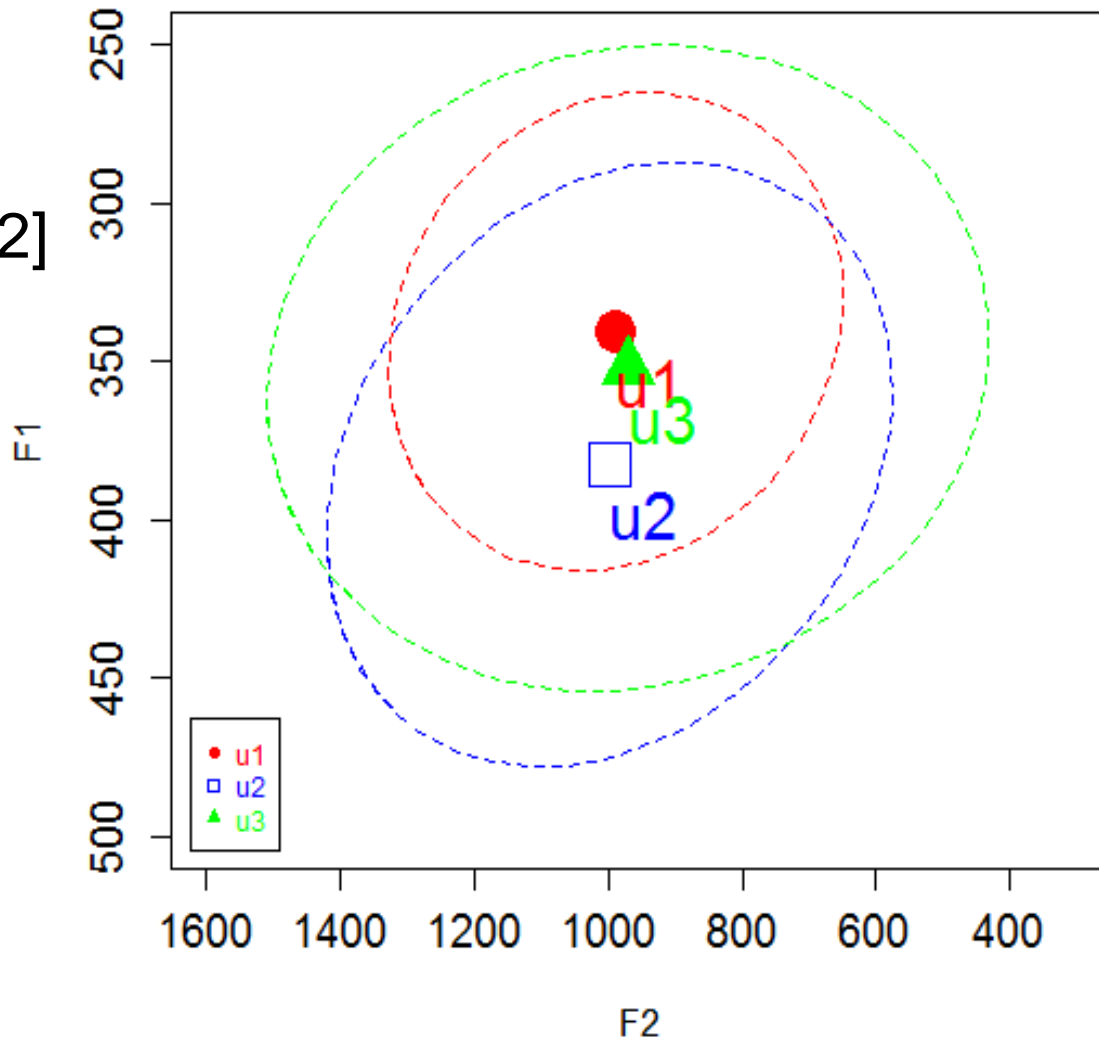
[u2] & [u3] ≠ [u1]

[Cu1.Cu2C.CV]

[Cu3.CəC.CV]

[u3] vs. [u2]

p<0.001

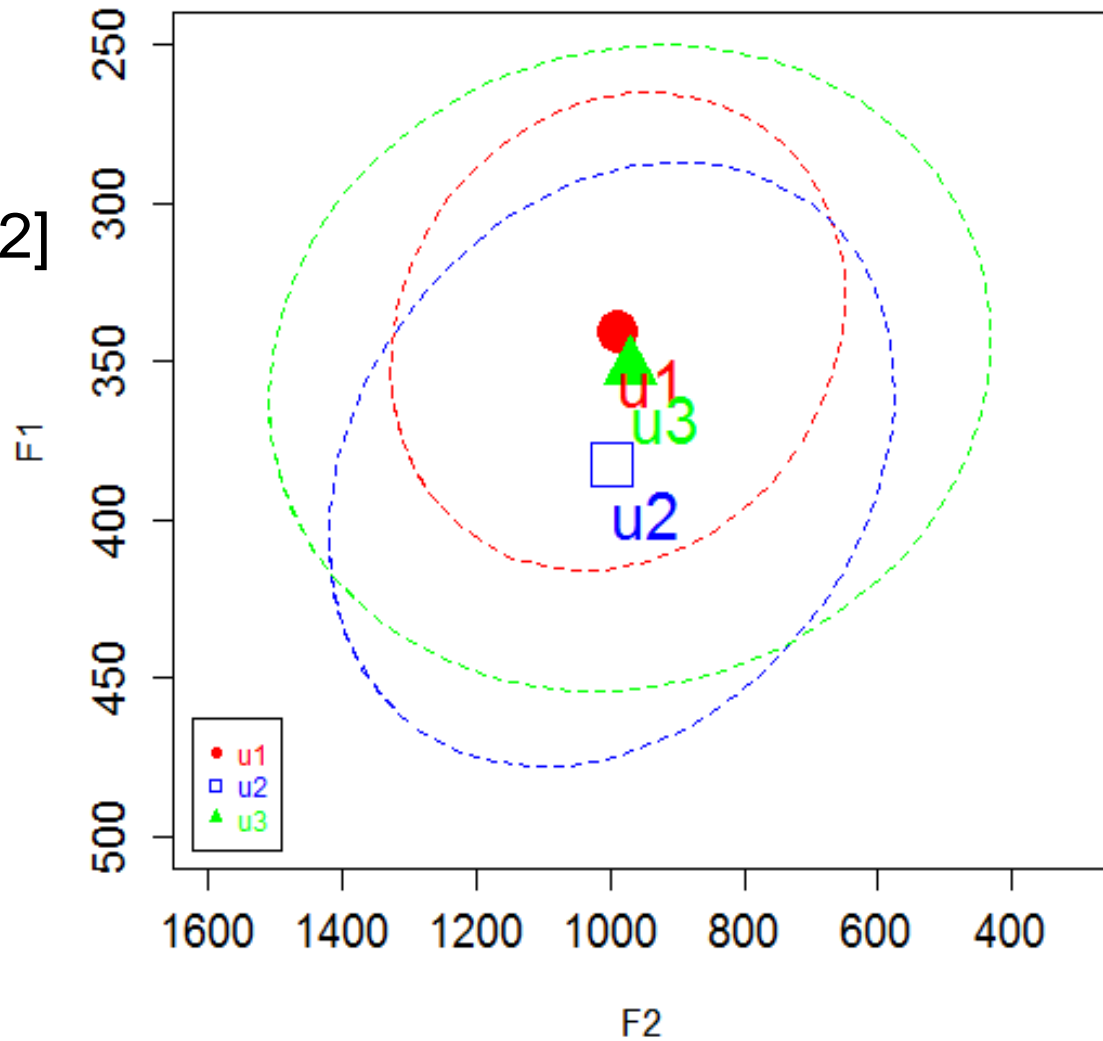


[Cu1.Cu2C.CV]

[Cu3.CəC.CV]

[u1] vs. [u2]

p<0.001

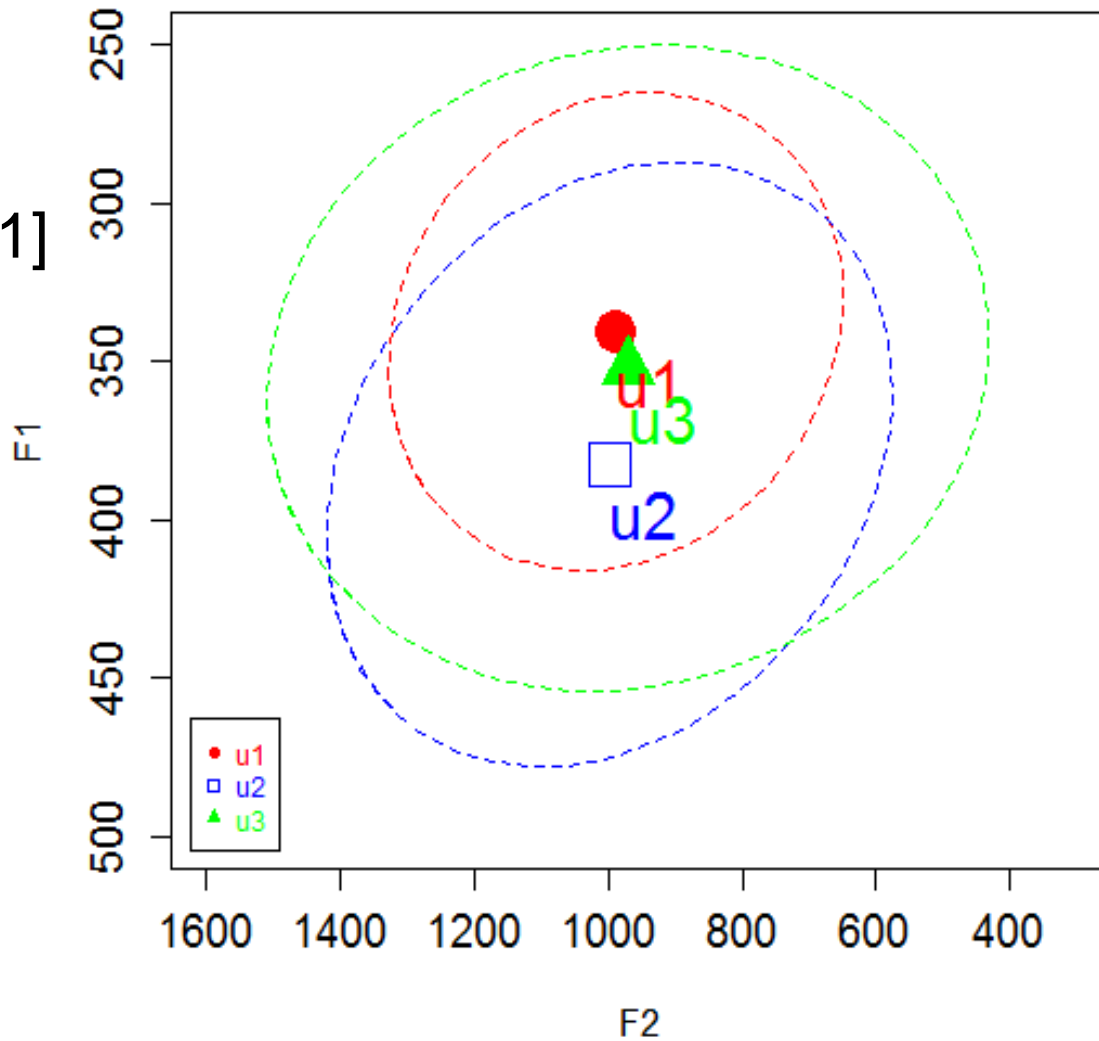


[Cu1.Cu2C.CV]

[Cu3.CəC.CV]

[u3] vs. [u1]

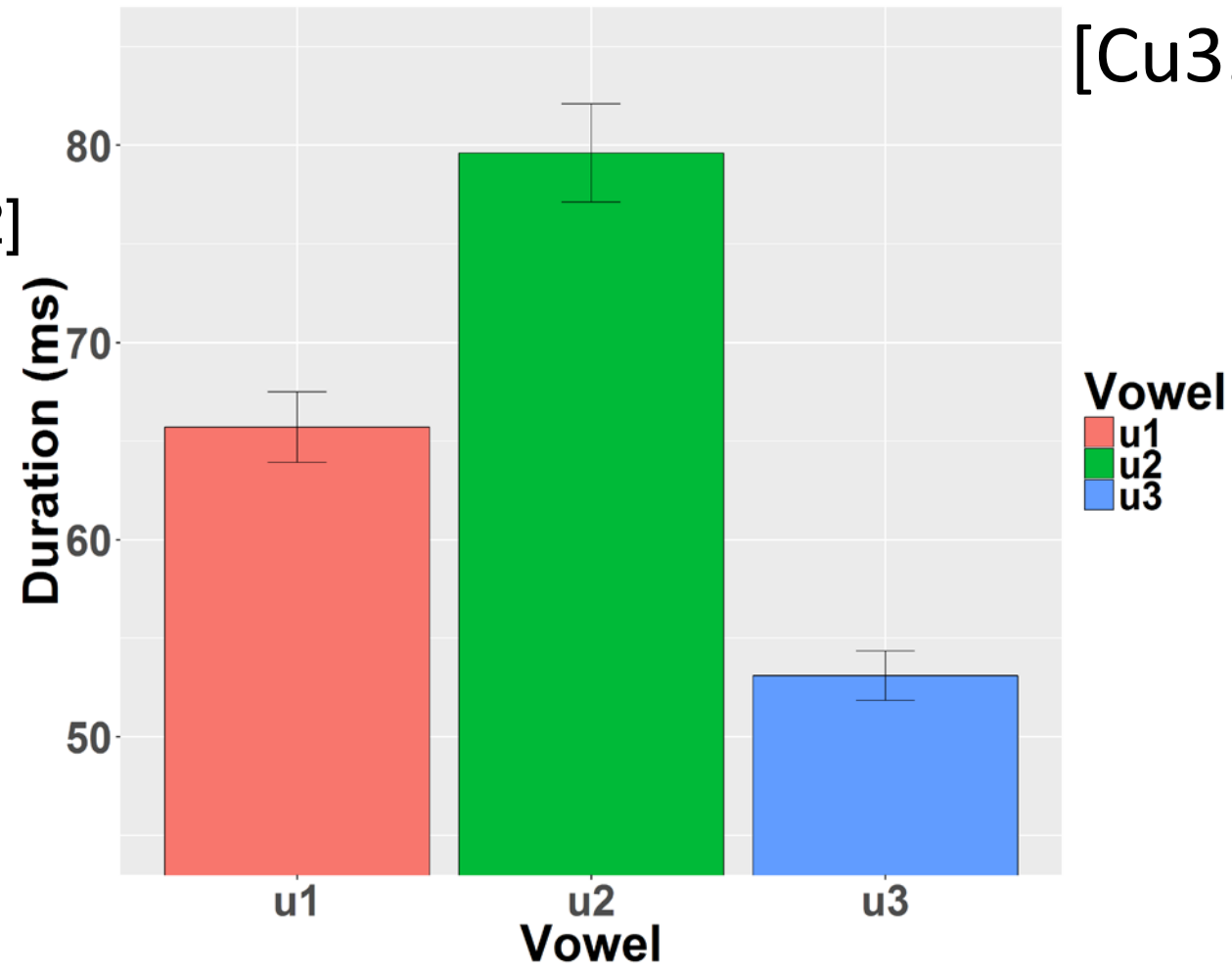
p=0.0206



[Cu1.Cu2C.CV]
[Cu3.CəC.CV]

[u1] vs. [u2]

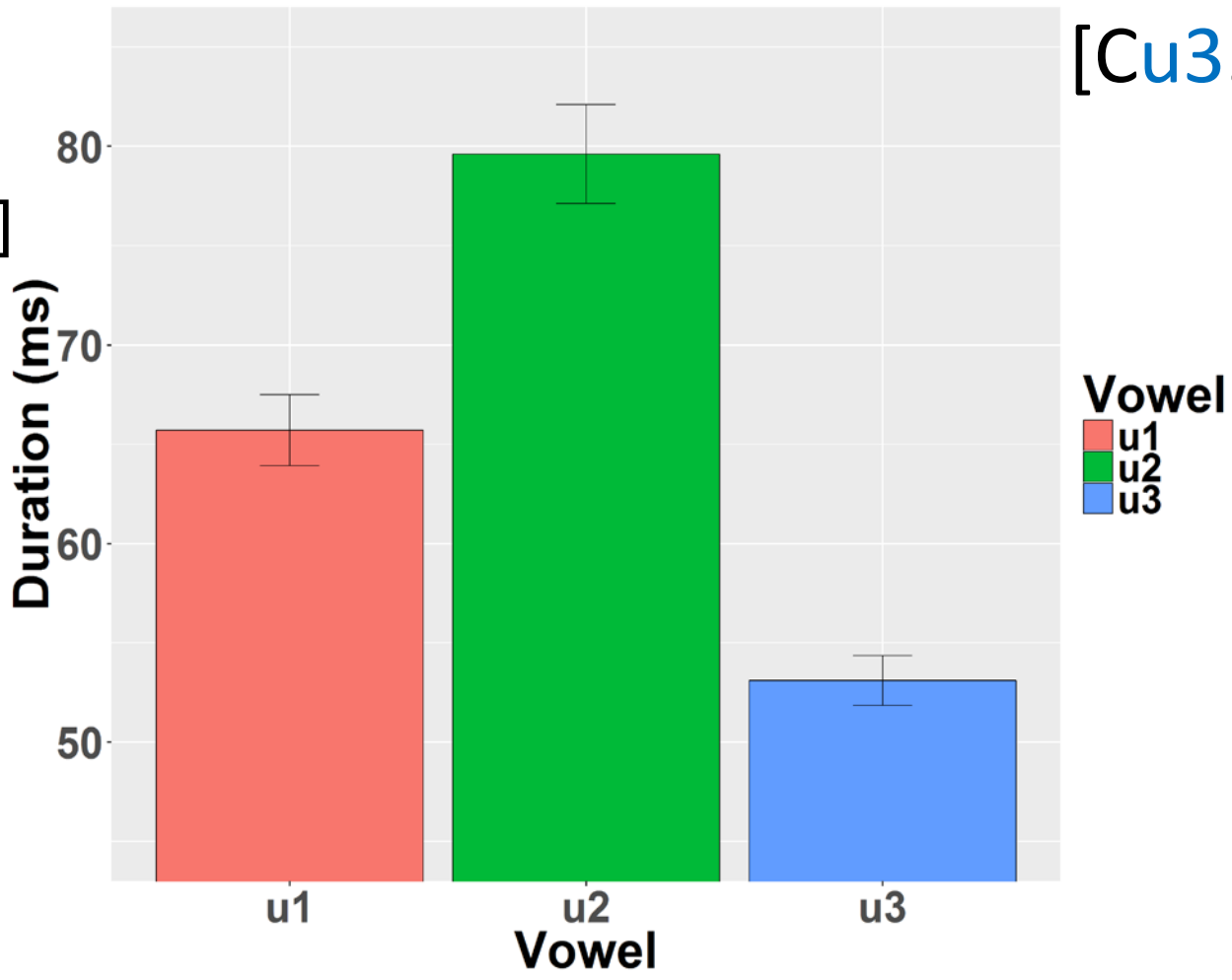
p<0.001



[Cu1.Cu2C.CV]
[Cu3.CəC.CV]

[u3] vs. [u2]

p<0.001

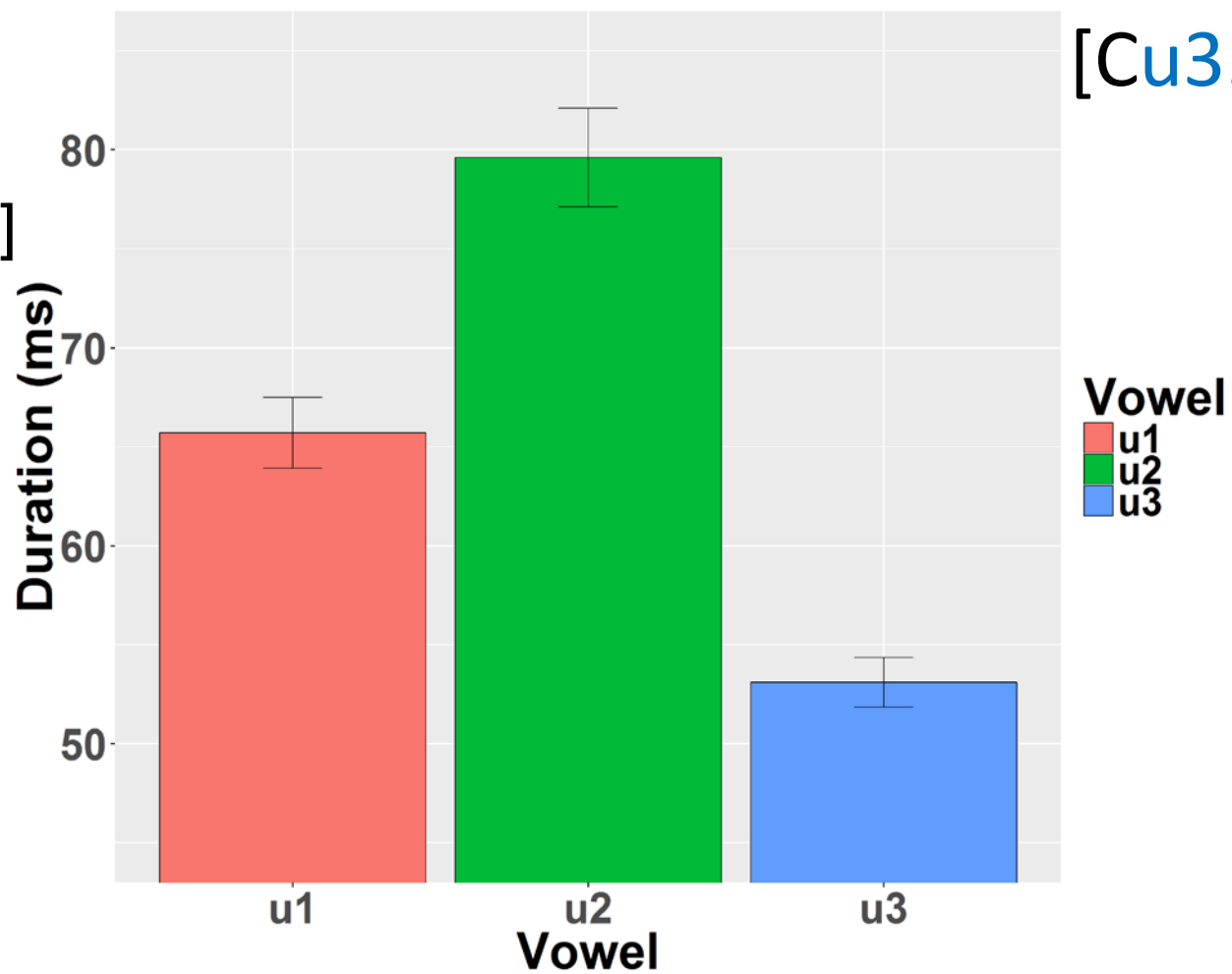


[Cu1.Cu2C.CV]

[Cu3.CəC.CV]

[u3] vs. [u1]

$p < 0.001$

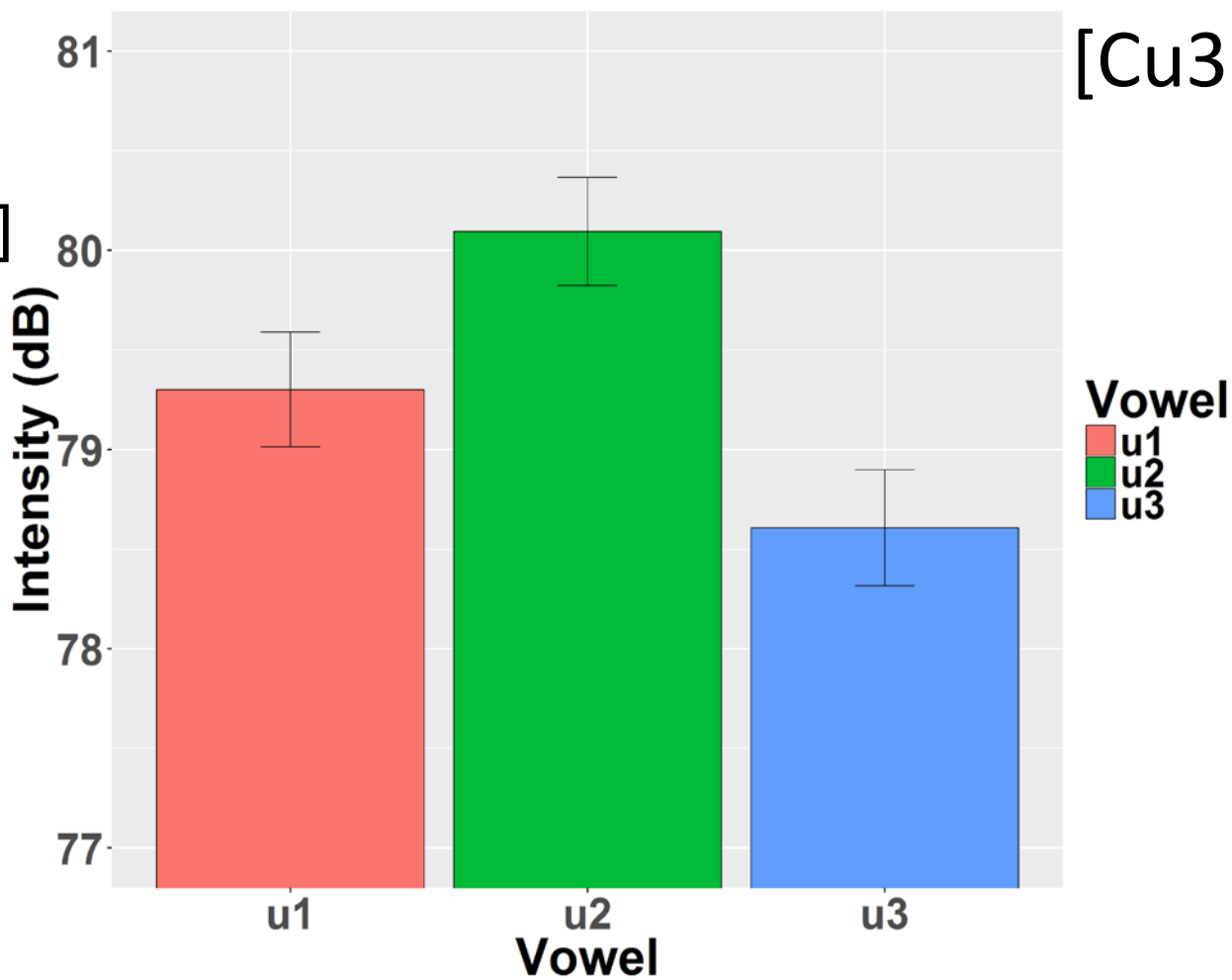


[Cu1.Cu2C.CV]

[Cu3.CəC.CV]

[u1] vs. [u2]

$p < 0.01$

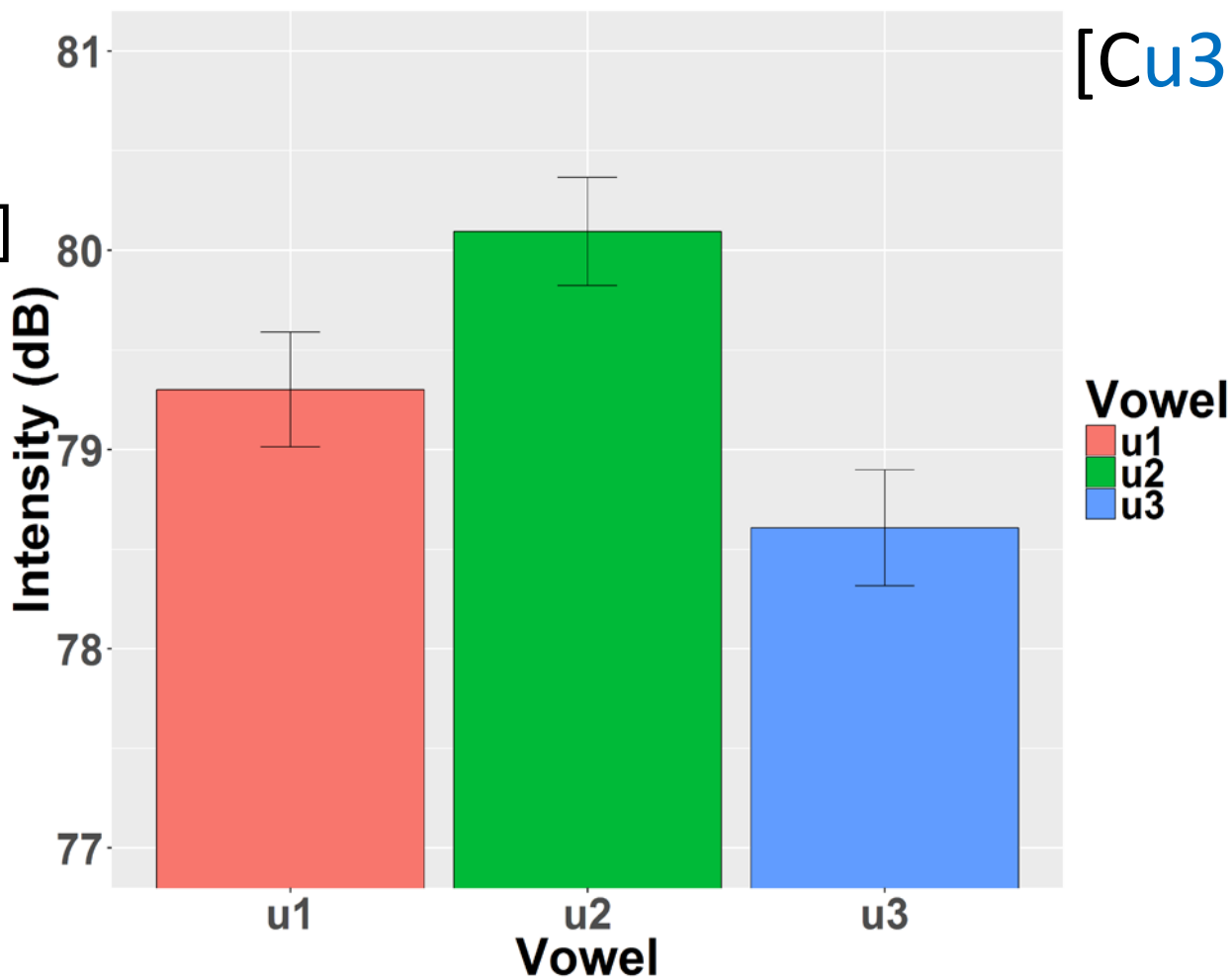


[Cu1.Cu2C.CV]

[Cu3.CəC.CV]

[u3] vs. [u2]

$p < 0.001$

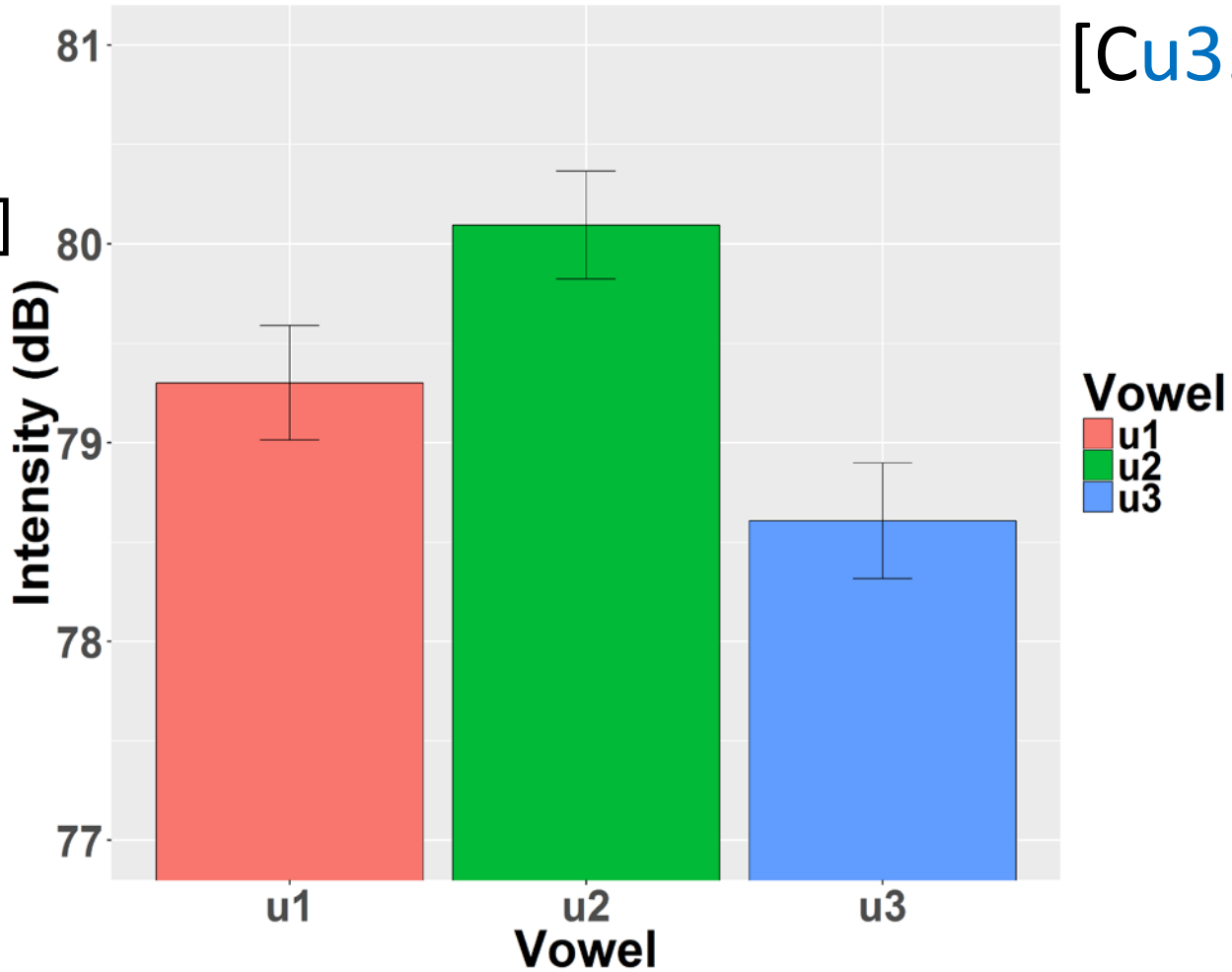


[Cu1.Cu2C.CV]

[Cu3.CəC.CV]

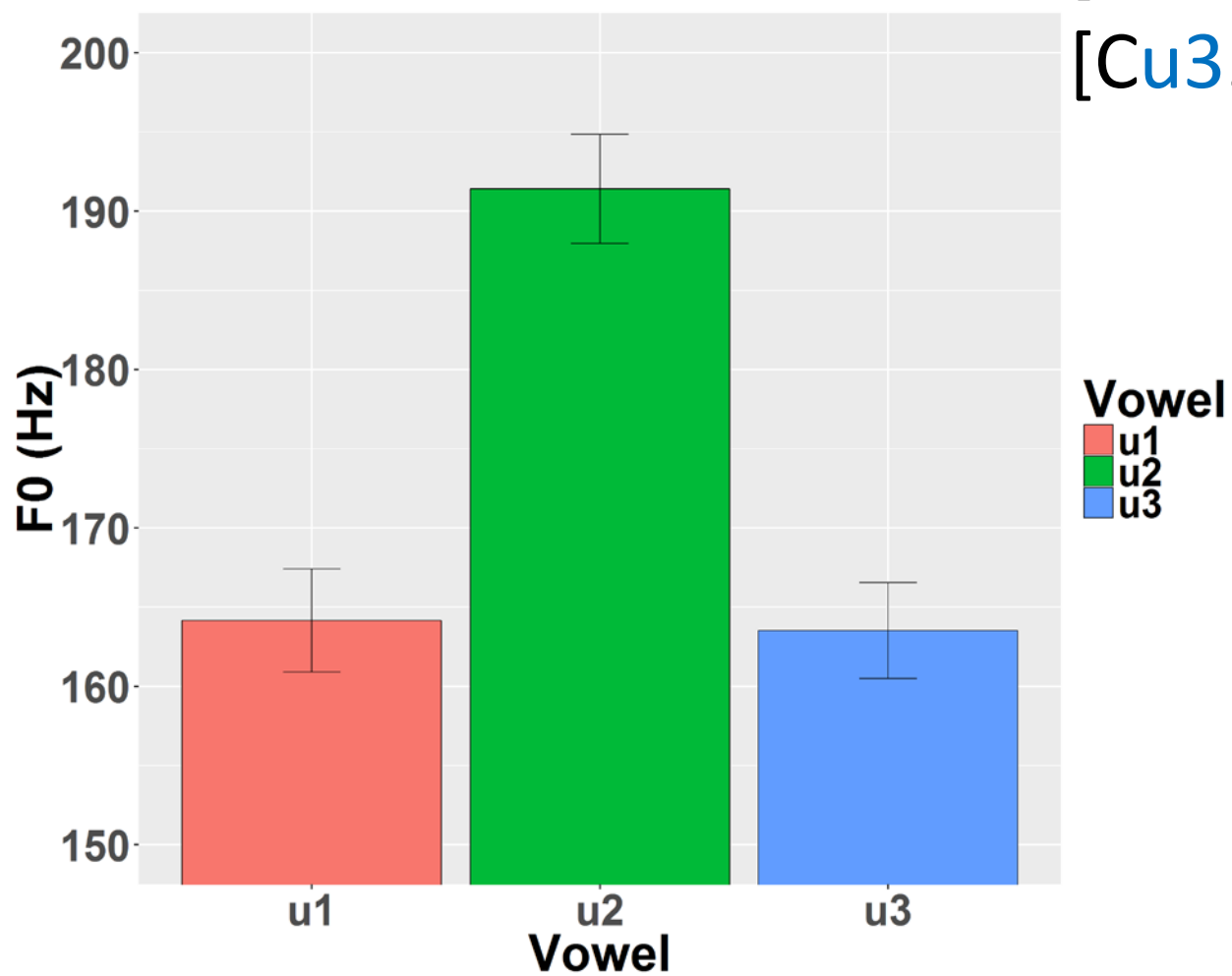
[u3] vs. [u1]

p=0.0331



[Cu1.Cu2C.CV]

[Cu3.CəC.CV]



Experiment: [ə]

- Head schwa might not have a different acoustic realization from non-head schwa
- Therefore stress(lessness) is not necessarily an indicator of headship for schwa
- Different vowels differ in how they realize headedness (i.e. whether they are stressable)

Part 3

Implications

Implications

- Methodological implications
 - No acoustic evidence found
 - No other work on sonority-driven stress
- Is there *phonological* evidence?
 - That is as yet unclear
 - I'll tell you in two years

Implications: symmetric response

- *Hd/ə
 - Motivates avoidance of stress on schwa
 - Motivates vowel neutralization (change [ə] to a more sonorous vowel)
- If there is no sonority-driven stress, then
 - There is no *Hd/ə
 - But then we lose vowel neutralization!

Implications: symmetric response

- Compare with SPE-like theories
- One response does not imply another...

Son-Stress: [+stress] \rightarrow [-stress] / in ə

(i.e. avoidance of stressed schwa)

Does not necessarily imply the following rule:

Neutralization: ə \rightarrow V / in stressed \$

(i.e. neutralization of schwa)

Summary

- Stress in Gujarati falls on the penultimate syllable.
- Schwa is stressless.
- Does sonority-driven stress exist anywhere?
- I will tell you in 2 years.

Acknowledgements

- QP Committee:
Paul de Lacy, Akinbiyi Akinlabi, Matt Gordon
- Gujarati RA:
Pooja Patel
- Phonology Lab RAs:
Ariana Lutz, Caitlin Celendano, Jessica Cody, Jillian van Brunt,
Sarah Elzayat
- Statistics:
ChunYen Cheng
- Rutgers PhonEx study group

Thank You!

Experiment: [a]

- Stimuli

(a) CaCa = baseline (x10 words)

(b) CiCi, CoCo, CuCu = baseline (x5 each)

(c) CaCo vs. CoCa (x5 types each)

(d) CaCu vs. CuCa (x5 types each)

(e) CaCi vs. CiCa (x5 types each)

(f) Ca.CəC vs. CəC.Ca vs. Cə.Ca (x5 types each)

Experiment: [a]

- Stimuli

- [CaCa], [CaCV], [CVCa], [CVCV]
- 1st C = voiceless/voiced stops
- 2nd C = voiceless stops
- Wug words
- 70 words x 3 repetitions x 2 sentences = **420** tokens per speaker

Experiment: [a]

- To encourage vernacular speech
 - Gujarati RA: Pooja Patel
 - Colloquial filler sentences

Descriptions

Source	a	ɛ ɔ e o	u	i	ə
Mistry 1997 de Lacy 2002: 2σ Cardona & Suthar 2003: 2σ & 3σ					
Cardona 1965: 2σ de Lacy 2002: 3σ Doctor 2004: 2σ Schiering & van der Hulst 2010: 2σ & 3σ					
Cardona 1965: 3σ Doctor 2004: 3σ					
Adenwala 1968: 2σ					
Modi 2013: 2σ					

Implications: Uncertainty?

- Gujarati is not a case of sonority-driven stress.
- If such an apparently clear example is not sonority-driven, then is there *any* sonority-driven stress?
 - There is no acoustic evidence for other sonority-driven stress systems
 - Though see Haghverdi (in prep.) and Gordon (in prep.)
- Or, perhaps stress can avoid schwa, but not other vowels.

Implications of the worst-case scenario

- *(non-)Head/{sonority} constraints drive sonority-driven stress.
- However, they have a symmetric effect: you can use them to neutralize, delete, and metathesize (de Lacy 2006, 2007).
So, if we get rid of them, we also lose our ability to do vowel reduction, etc. etc.

Why is misperception responsible?

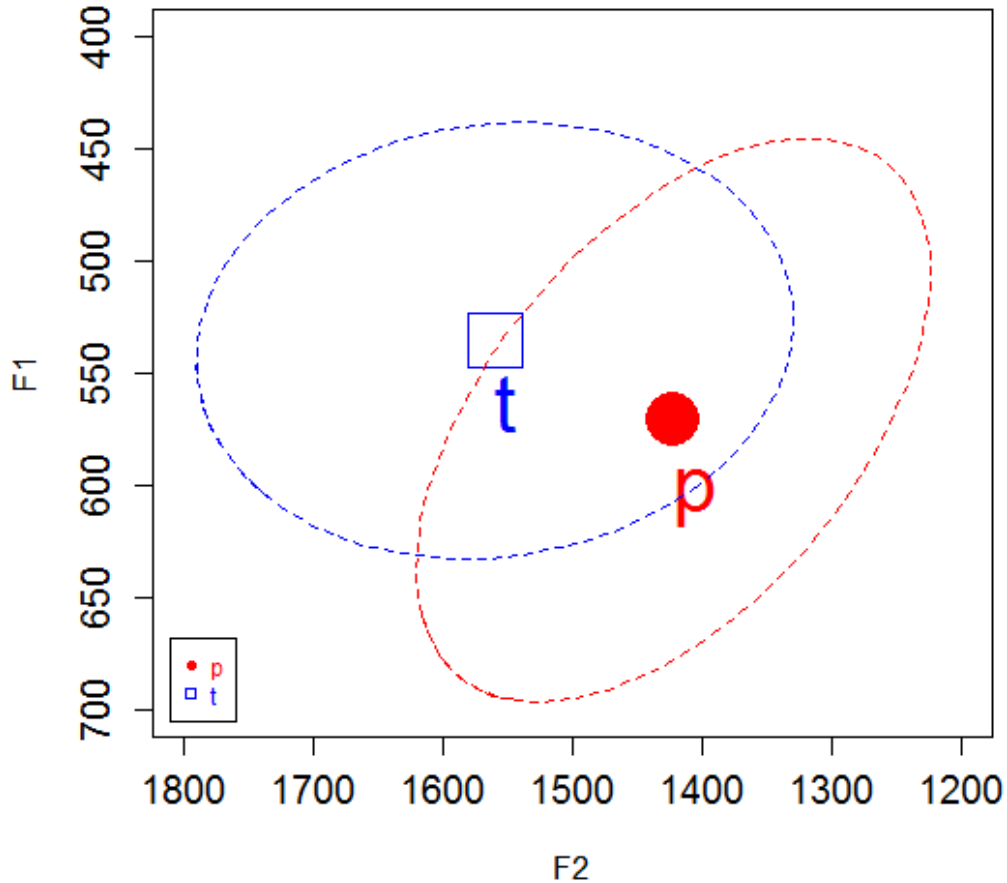
- Dobrovolsky's Chuvash
- What happens when people expect cues that don't occur?
 - They attend to other, minor cues
 - Inherent vowel duration differences
 - Intonation
 - Investigators' native perceptual system

Schwa 1

[Cə1.Cə2C.CV]
[Cu.Cə3C.CV]

[ət] = 7

[əp] = 3

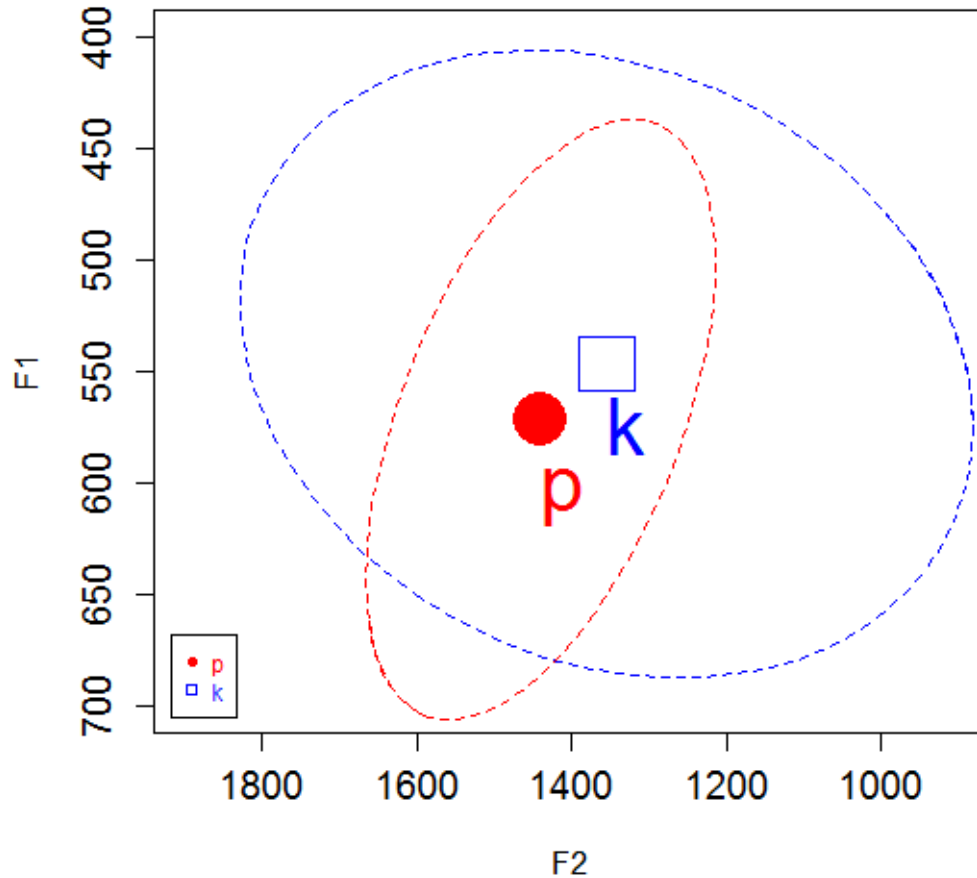


Schwa 2

[Cə1.Cə2C.CV]
[Cu.Cə3C.CV]

[ək] = 6

[əp] = 4



Schwa 3

[Cə1.Cə2C.CV]
[Cu.Cə3C.CV]

[ək] = 5

[əp] = 1

[ət] = 4

