

Apparent-time change in Turkish front-mid-vowel allophony

Deepthi Gopal (Uppsala) & **Stephen Nichols** (Oxford / Essex)

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Background

The basic problem

The phenomenon. Front mid vowels /e/ and /ø/ undergo alternations conditioned by the following coda.

- — **before coda sonorants**, i.e. /r, l, m, n/ (+ complications).
 - Noted in previous descriptive literature, but not very thoroughly, not based on experimental work, & with a lot of systematic variability (...) and not at all in the phonetic or phonological literature.
 - The latter except our previous work (Gopal & Nichols ... eventual)
- In addition to the need for an up-to-date picture of the Turkish vowel system, this raises both **synchronic** and **diachronic issues**.
 - How is this active class defined? How **natural** is it? Is class information in this case straightforwardly phonetic or phonological?
 - Even though ‘the sonorants’ is a class we can describe, it is a **relatively rare active class**, which is plausibly due to its **lack of phonetic unity**.
 - **How did this system arise?** Is it consistent with pictures of phonological change that assume that new patterns are always phonetically well-grounded?

Background

The Turkish vowel system

So far. Front mid vowels /e/ and /ø/ undergo alternations conditioned by the following coda.

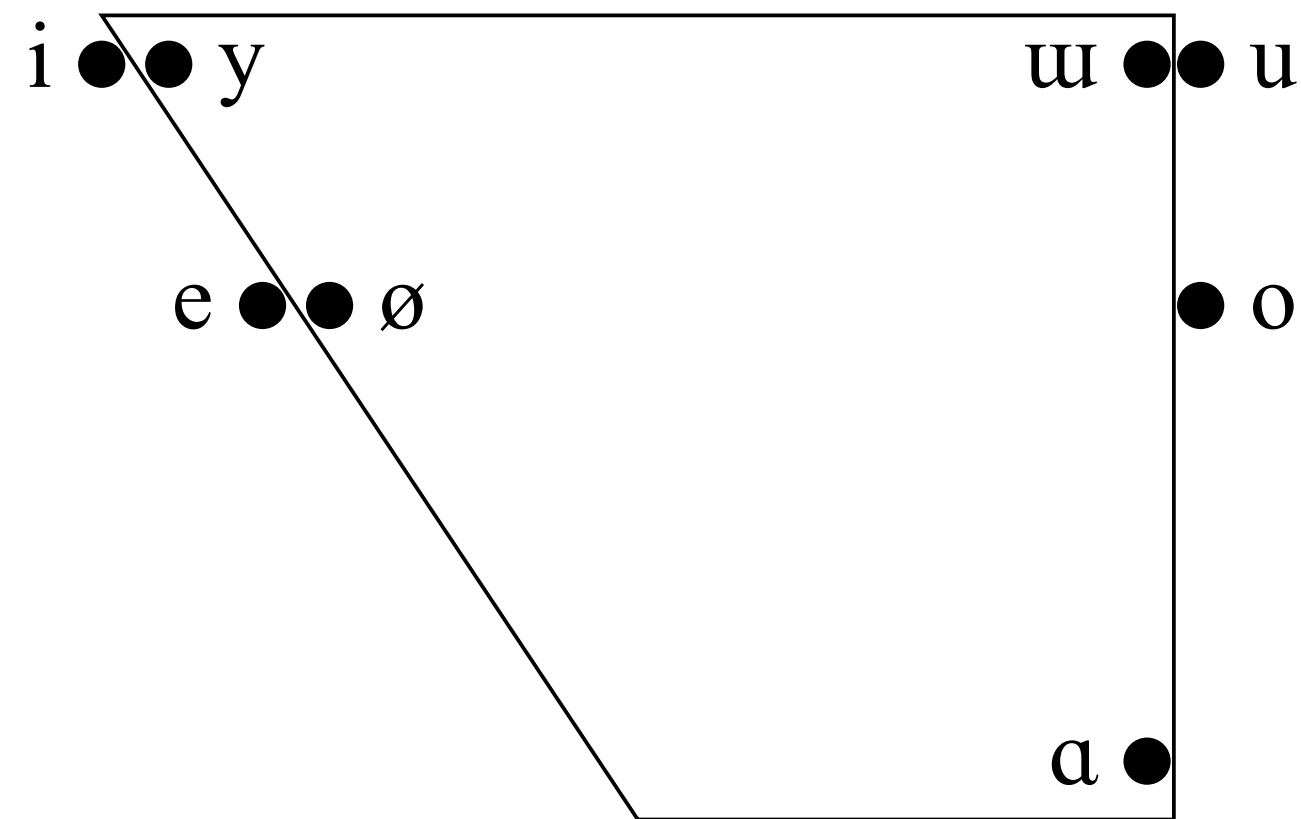
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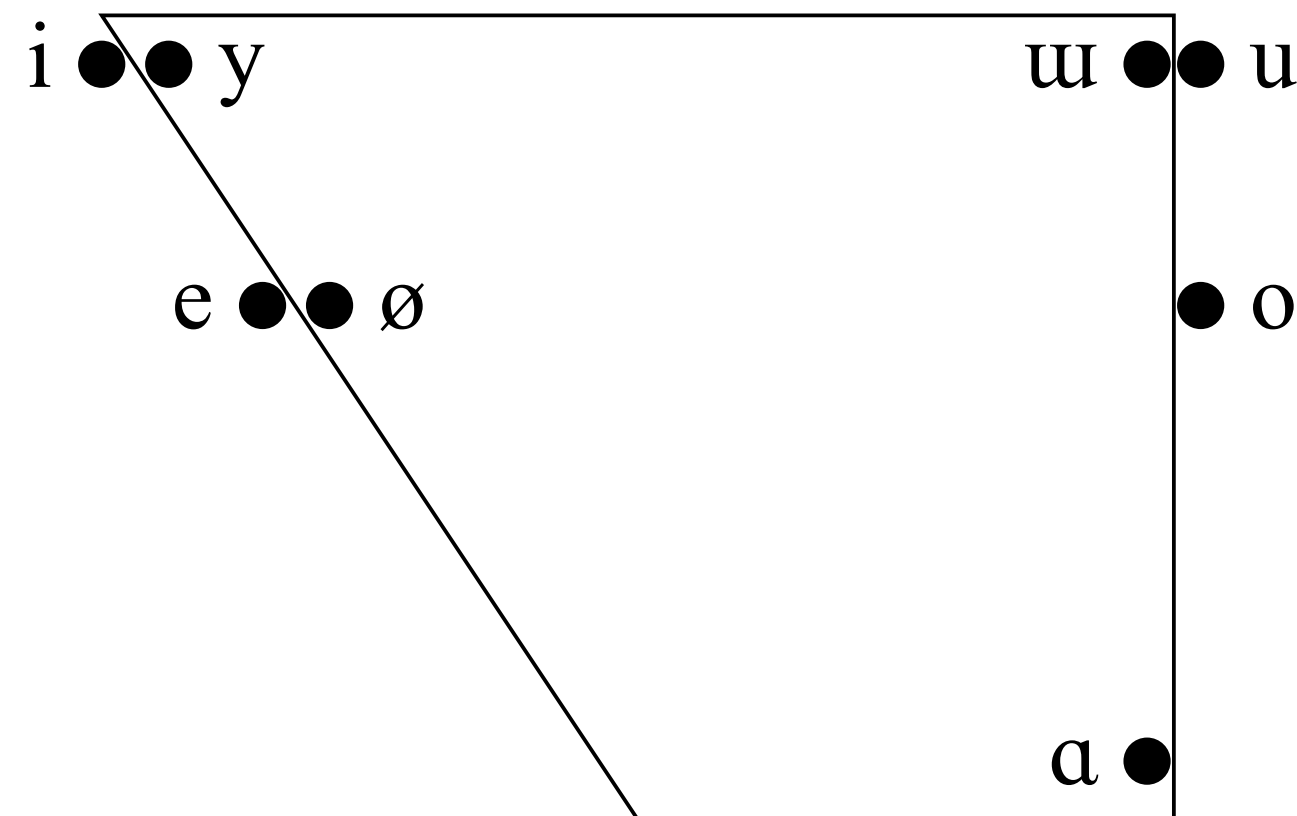


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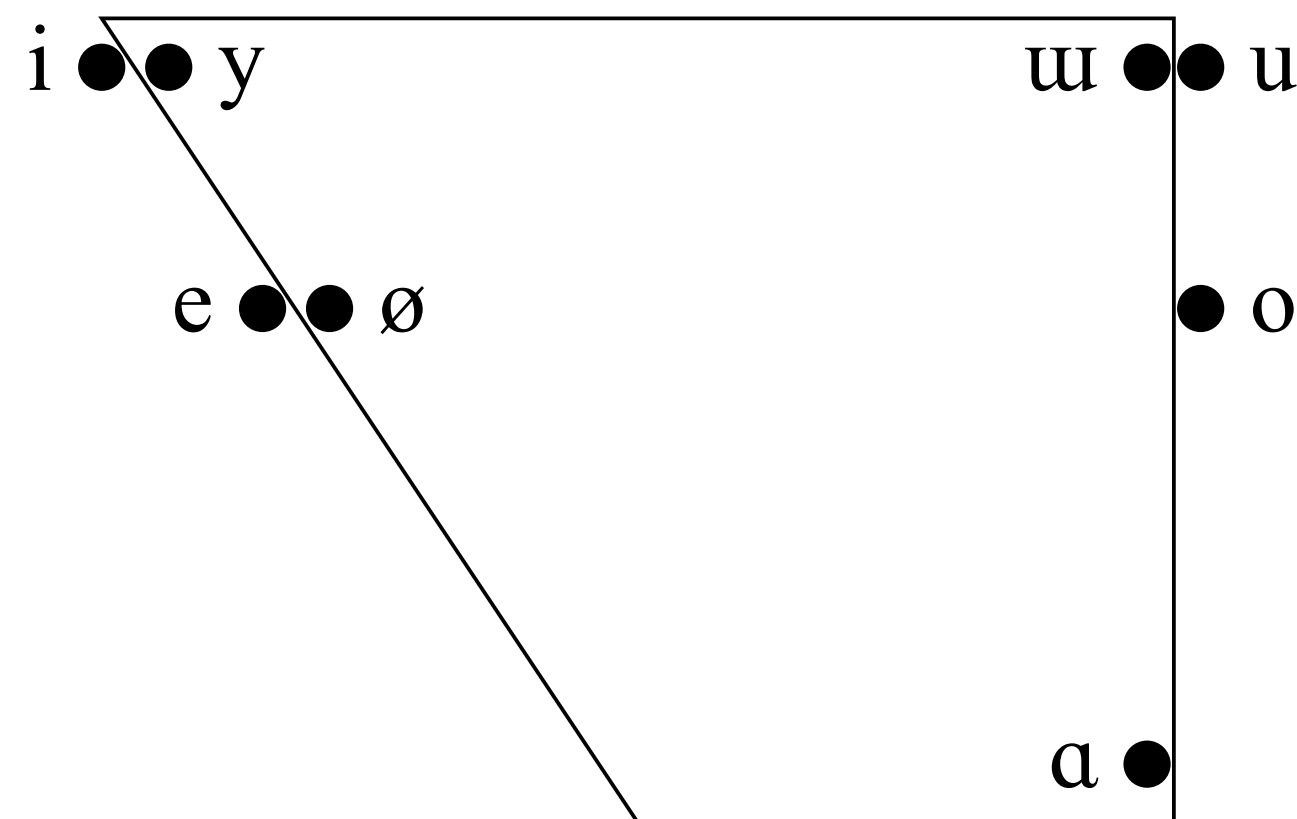
but really only in initial syllables

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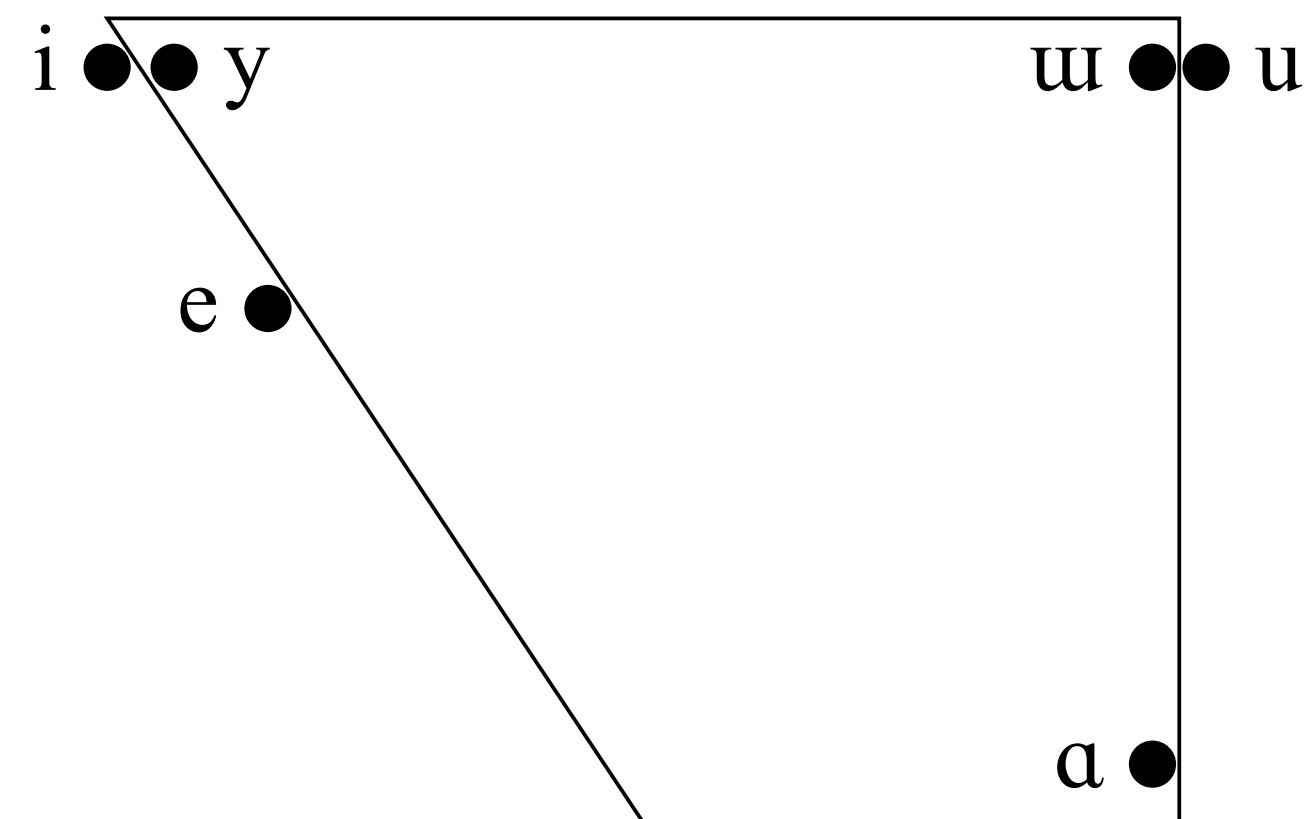
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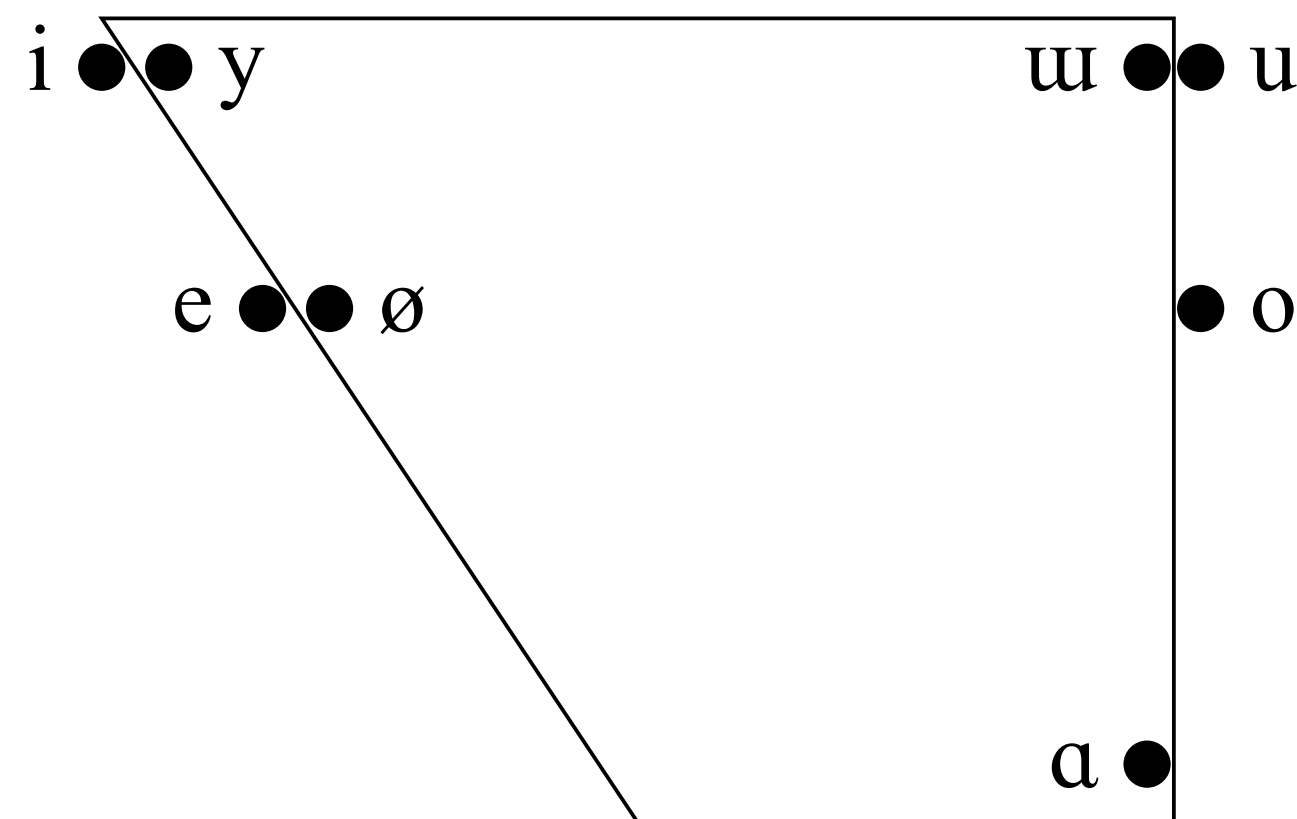
outside initial syllables, mid round vowels largely disappear (never legit output of pervasive rounding harmony)

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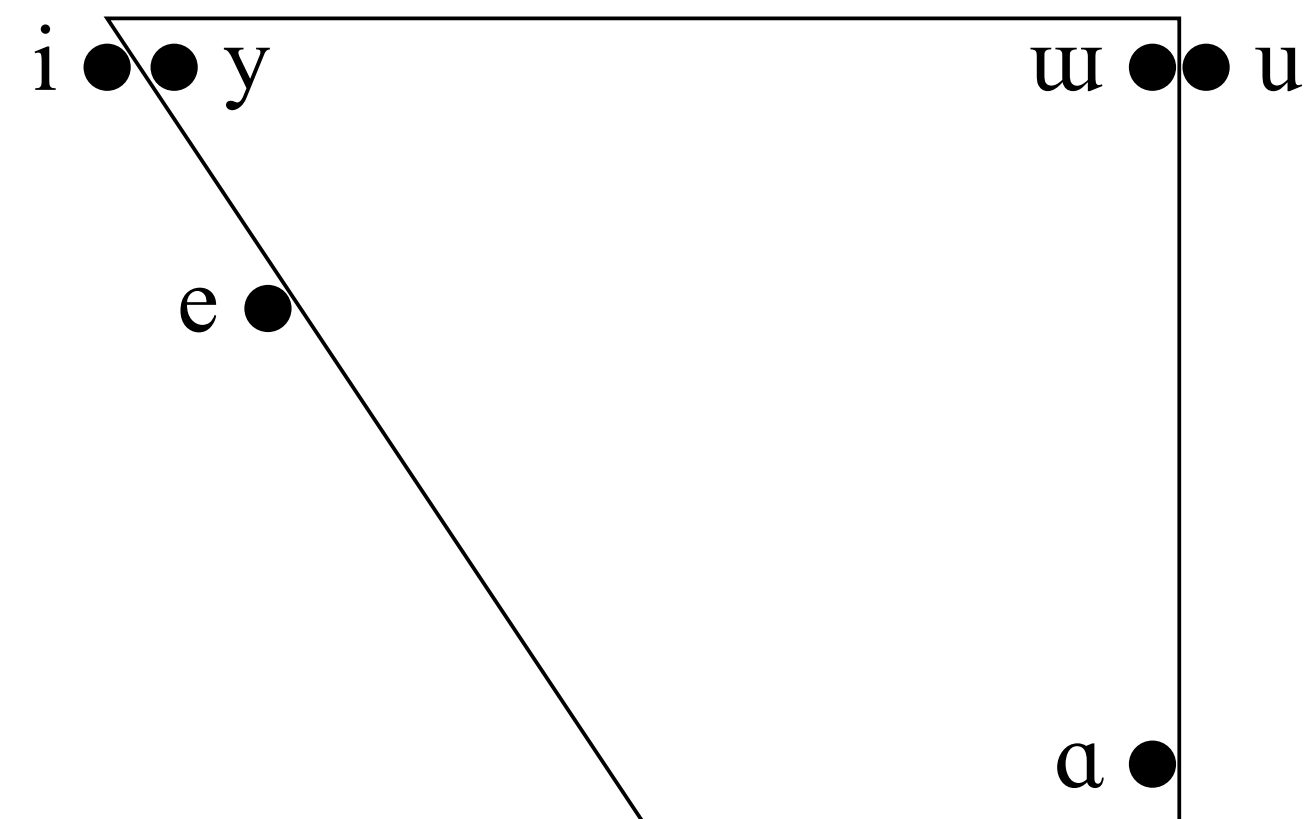
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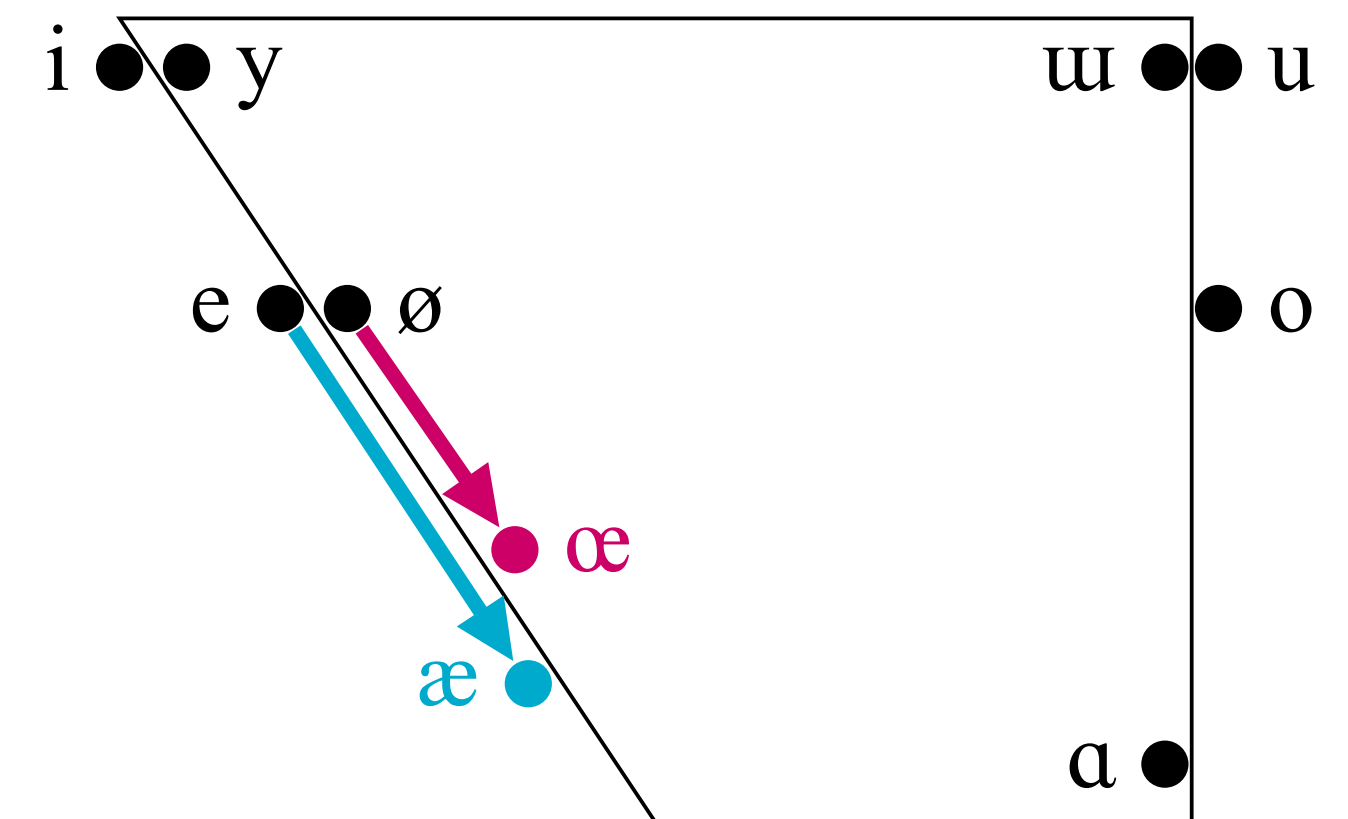
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... worth observing at this stage that vowels in this pattern go where they have room to go

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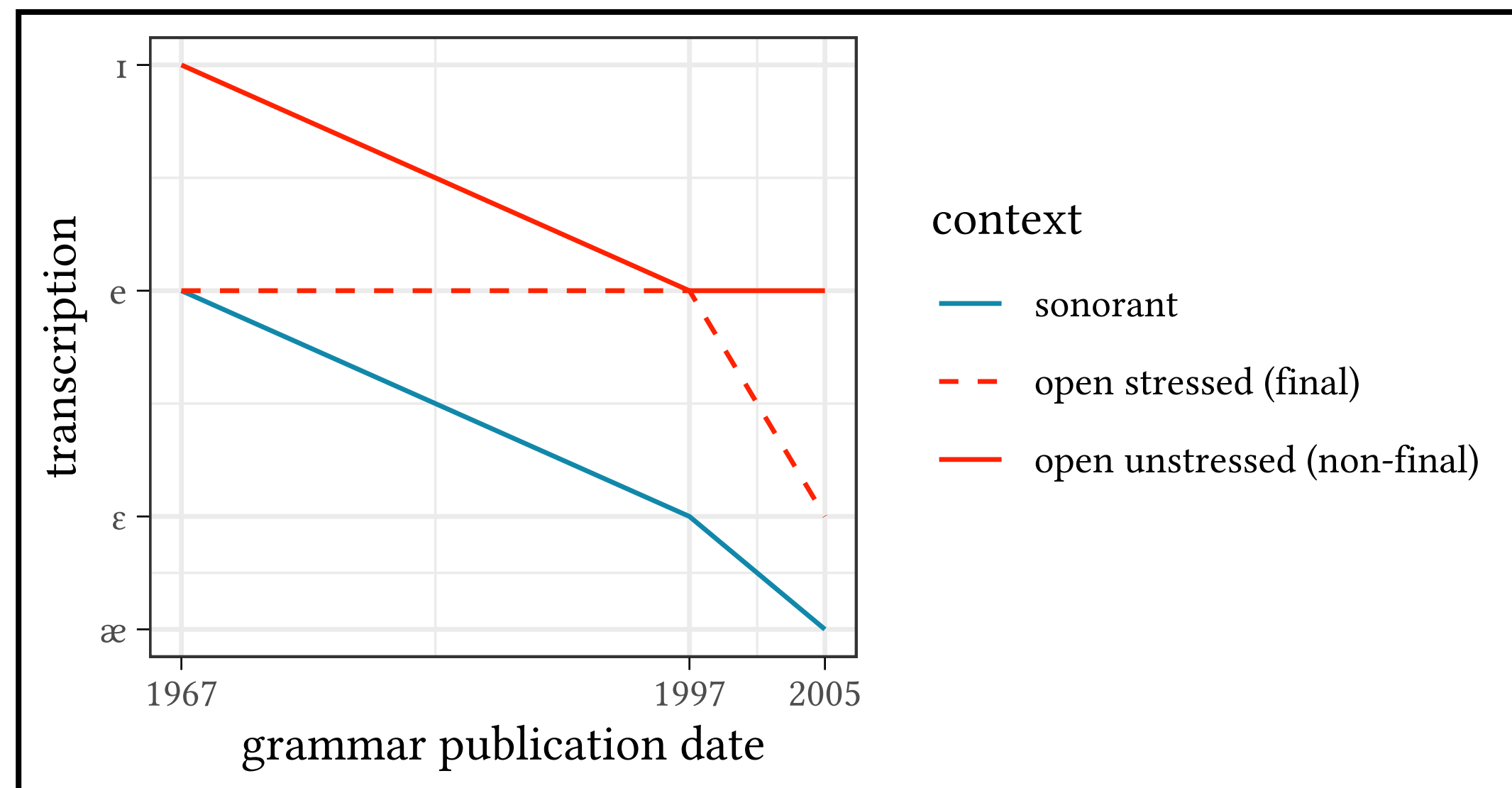
- General point of agreement: Turkish has 8 vowels in a pretty symmetrical system.
- **Previous descriptions.** We claimed that there's a little bit of attestation of this phenomenon in the descriptive literature. Here is what we have found:
 - Lewis's (1967, 14) reference grammar: describes **raising in unstressed open syllables**: 'a closer pronunciation, verging on the sound of i, especially in the first syllables of [...] gece 'night' ', but mentions **no lower allophone** and **no preconsonantal effects of any kind**.
 - Kornfilt (1997, 512), 30 years later: an 'alternation phenomenon affects the front, nonhigh vowels [e] and [ø], **which are lowered before sonorants in closed syllables**'. She transcribes the lower allophone of [e] as [ɛ], but this seems to be an impressionistic judgment, not a measurement.
 - Göksel and Kerslake (2005) give the distribution of /e/ as [æ] **before sonorants**, [ɛ] **in stressed open syllables**, and [e] **elsewhere**.

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- General point of agreement: Turkish has 8 vowels in a pretty symmetrical system.
- **Previous descriptions.**



apparent-time plot
of descriptive
grammars of Turkish

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Mid-vowel alternations in Turkish

The phenomenon. Front mid vowels /e/ and /ø/ undergo alternations conditioned by the following coda.

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/erdem/	[æ r.d æ m]	'virtue'
/hejkel/	[hej.k æ l]	'statue'
/gizem/	[gi.z æ m]	'mystery'
/biber/	[bi.b æ r]	'pepper'
/gøl/	[g œ l]	'lake'
/gømmek/	[g œ m.mek]	'bury'-INF
/şoför/	[ʃo.f œ r]	'driver'

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This is destroyed by resyllabification-inducing affixation.

/erdem/	[æ r.d æ m]	‘virtue’
/hejkel/	[hej.k æ l]	‘statue’
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/gøl/	[g œ l]	‘lake’
/gømmek/	[g œ m.mek]	‘bury’-INF
/ʃofør/	[ʃo.f œ r]	‘driver’

[æ r.d e .mi]	‘virtue’-ACC
[hej.k e .li]	‘statue’-ACC
[gi.z e .miz]	‘mystery’-1PL.POSS
[bi.b e .rin]	‘pepper’-2SG.POSS
[g ø .ly]	‘lake’-ACC
[g ø .mer]	‘bury’-INF
[ʃo.f ø .ryn]	‘driver’

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No such lowering applies in other types of environment (pre-stop, pre-fricative, pre-#)

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/biber/	[bi.b æ r]	‘pepper’	[bi.b e .rin]
/gøl/	[g œ l]	‘lake’	[g ø .ly]
/gømmek/	[g œ m.mek]	‘bury’-INF	[g ø .mer]
/fofør/	[fo.f œ r]	‘driver’	[fo.f ø .ryn]

/bebek/	[b e .bek]	‘baby’
/hejkel/	[h e j.kæɫ]	‘statue’
/herkes/	[hæ.r.k e s]	‘everyone’
/tʃøp/	[tʃ ø p]	‘garbage’
/gøz/	[g ø z]	‘eye’
/søjle/	[s ø j.le]	‘say’-IMP.2SG
/ban.li.jø/	[ban.li.j ø]	‘suburb’

/j/ is probably not a sonorant anyway.

1. sonorant-obstruent clusters ok word-finally (ders, mert, genç, renk ...), but j+C clusters in recent loans (teyp, feyk) broken up by high-vowel epenthesis.
2. coda h-deletion pervasive before sonorant onsets (fihrist 'index', tehlike 'danger', Mehmet), but not j: Yahya, Kütahya

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in some syllables closed by /z/

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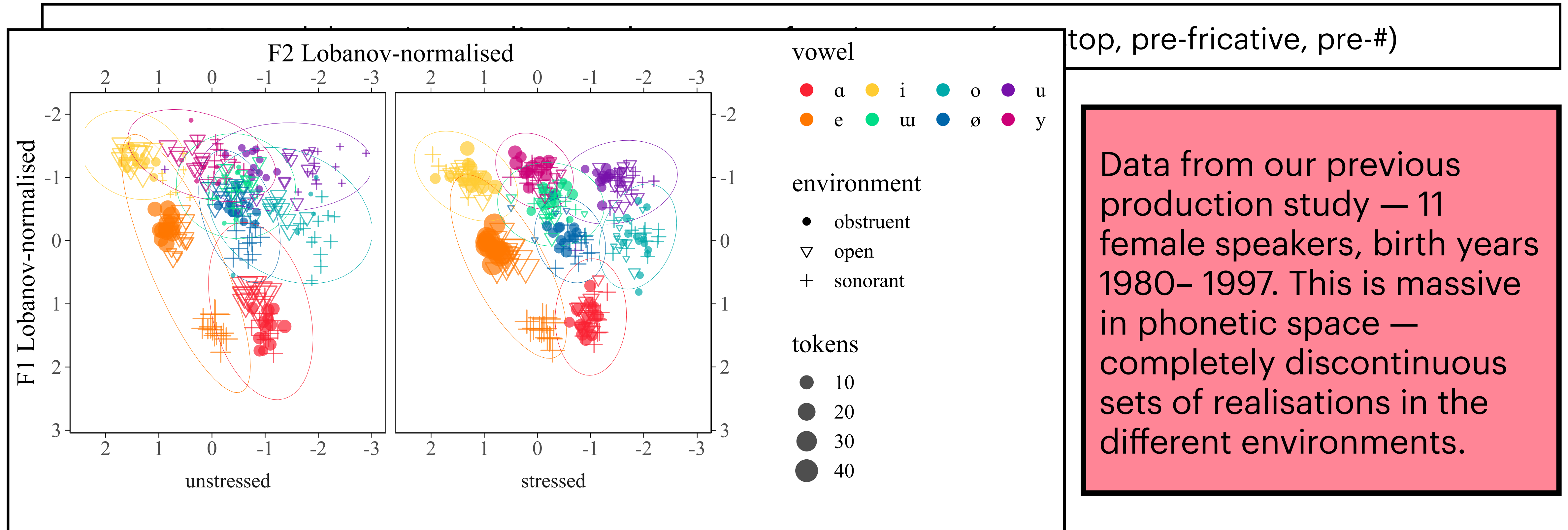
/pekmez/	[pek.m æ z]	‘molasses’
/merkez/	[mæ.r.k æ z]	‘centre’
/gel-mez/	[gæl.m æ z]	‘go’-NEG.AOR

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Typology & diachrony

Some preliminary anxieties

So far. Front mid vowels /e/ and /ø/ undergo alternations conditioned by the following coda.

/r l m n/? /z/? Is this really a good idea?

- **Question.** How natural is phonological change, *really*?

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- Our case is at the intersection of two broader typologies of basically phonetically well-motivated phenomena:
 - **vowel quality effects conditioned by syll. structure** (‘closed syllable vowel laxing’)
 - Closed-syllable vowel laxing is well-established, but **only sometimes predicated on the manner of articulation of the coda consonant**, and usually if so **only licensed with consonants that are particularly good phonetic precursors to lowering**.
 - **sonorant-related height effects**
 - Sonorant-triggered height effects are common but **rarely dependent on syllable structure** and **rarely independent of the choice of segment within that class**;
 - and the different sonorants have very different phonetics...

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- Both diagnoses suggest that we should think about the relationship between the different consonants in this class and the pattern that they trigger.
 - Strong articulatory and acoustic properties of the **rhotics cross-linguistically favour the development of height effects in a pre-rhotic vowel.**

lowered third formant (Ladefoged 2003); **trills** (Recasens 2002, Recasens & Pallarès 1999) **force tongue dorsum lowering** and retraction

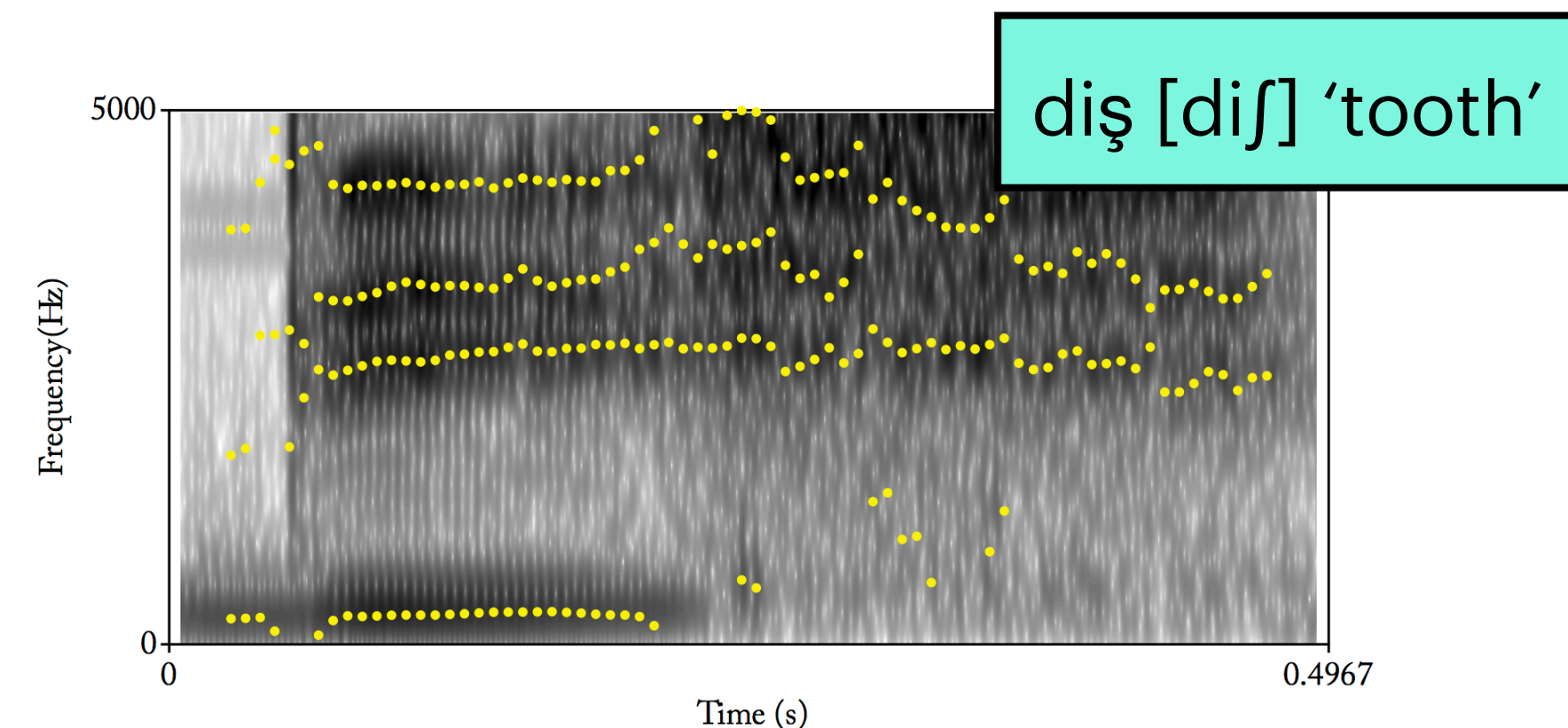
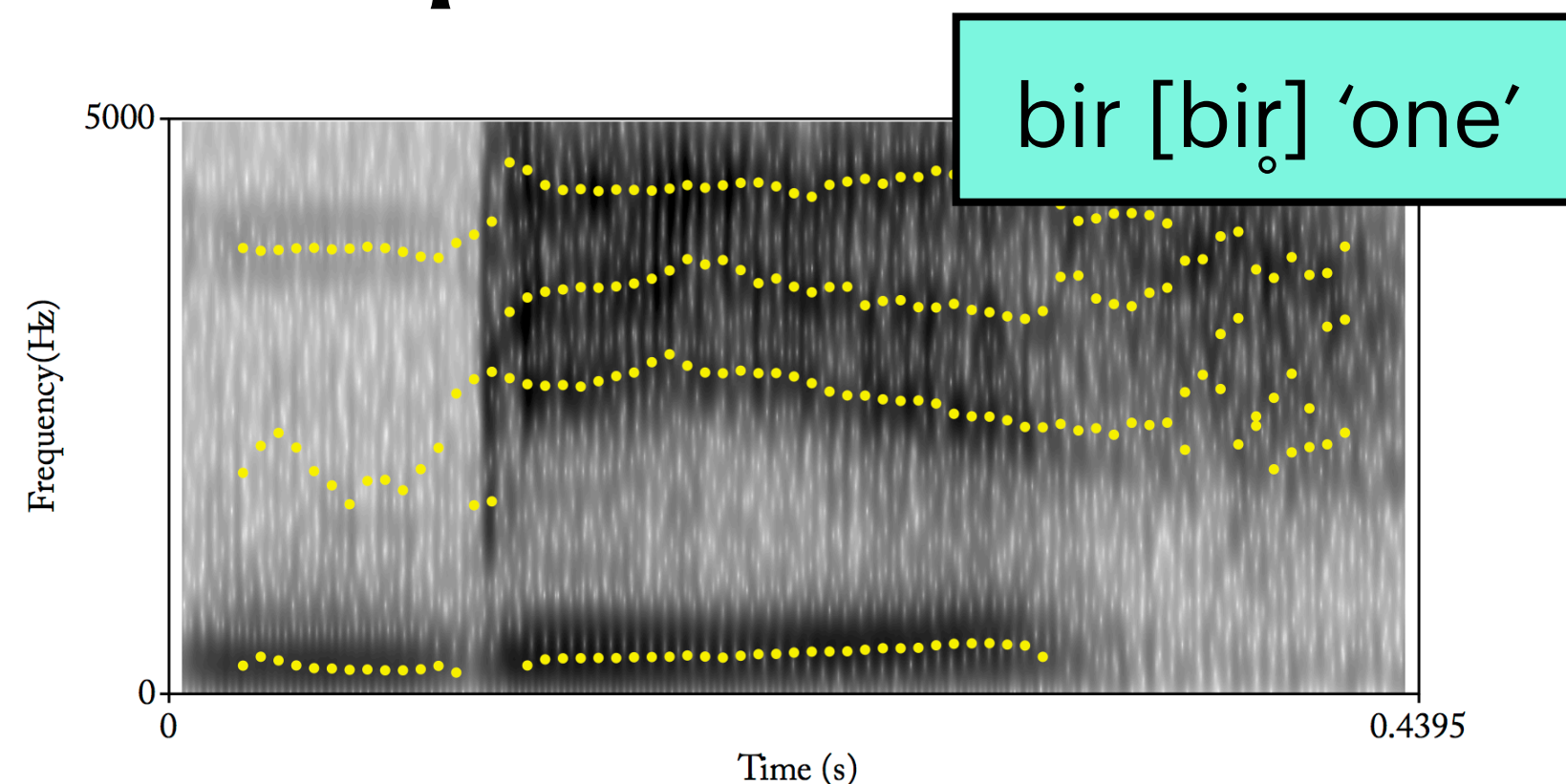
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 - **The laterals are less straightforward.** Languages with lowering rules often ignore them.

while **velar laterals** should cause **F2 decrease & F1 increase** (Recasens 2012, Carter & Local 2007), **palatalised laterals** should cause **F1 decrease = raising**

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 - **The laterals are less straightforward.** Languages with lowering rules often ignore them.
 - **The nasals are a bit ambivalent — associated with both phonetic raising and lowering.**

anticipatory nasalisation should increase F1 (Krakow et al. 1988), but the **nasal anti-formant** causes **perceptual raising** in low-mid, low vowels.

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- **Take-home message.** The set of segments involved in the Turkish case, considered individually, contains:
 - some unambiguously pretty good phonetic triggers for lowering (r)
 - some triggers whose effect depends crucially on secondary articulation (l good if velarised, bad if palatalised);
 - some triggers whose potential effects are multifarious, potentially competing (m, n)

The corpus

Speaker metadata

Name	Gender	Birthyear	Birthplace
Nazim Hikmet	M	1902	Thessaloniki
Oktay Rifat	M	1914	Trabzon
Orhan Veli	M	1915	İstanbul
Behçet Necatigil	M	1916	İstanbul
Can Yücel	M	1926	İstanbul
Gülten Akin	F	1933	Yozgat
Hilmi Yavuz	M	1936	İstanbul
Refik Durbaş	M	1944	Erzurum
Metin Cengiz	M	1953	Ardahan
Tugrul Tanyol	M	1953	İstanbul
Haydar Ergülen	M	1956	Eskişehir
Adnan Özer	M	1957	Gazioğlu/Tekirdağ

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Metin Celâl	M	1961	Ankara
Reha Yünlüel	M	1967	Edremit
Gökçenur Çelebioğlu	M	1971	İstanbul
Onur Behramoğlu	M	1975	İstanbul
Nilay Özer	F	1976	İstanbul
Mehmet Altun	M	1977	Kars
Efe Duyan	M	1981	İstanbul
Neslihan Yalman	F	1982	Ankara
Gonca Özmen	F	1982	Burdur
Müesser Yeniay	F	1984	İzmir
Kaan Koç	M	1986	İstanbul

Publically-available recordings of poets reading their own poems (public figures who we can therefore name).

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Tugrul Tanyol	M	1953	İstanbul	Gonca Özmen	F	1982	Burdur
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24 speakers (19 male, 5 female; birth years 1902–1986, median 1957). 276 minutes of (largely) continuous speech (median 10 minutes per speaker), with 12,630 tokens of /e/ in all (3,270 before tautosyllabic sonorants, 1,812 before tautosyllabic obstruents, 7,548 in open syllables). This presentation: 14 of the 24 speakers, all male.

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largest number of speakers M. from Istanbul — we expect this to be point of origin / these speakers alone might be best picture of 'stationary' diachrony (but won't get into that here)

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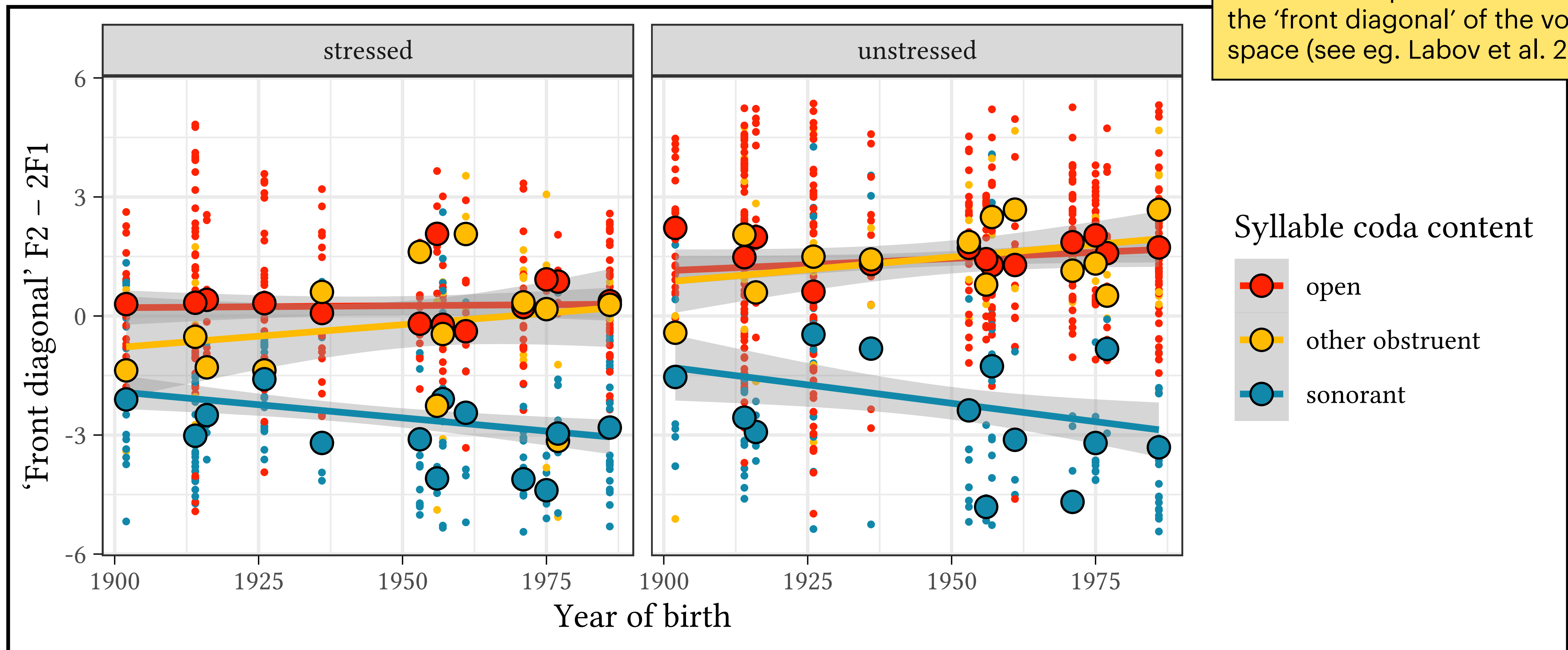
Data

/e/-realisations across environments

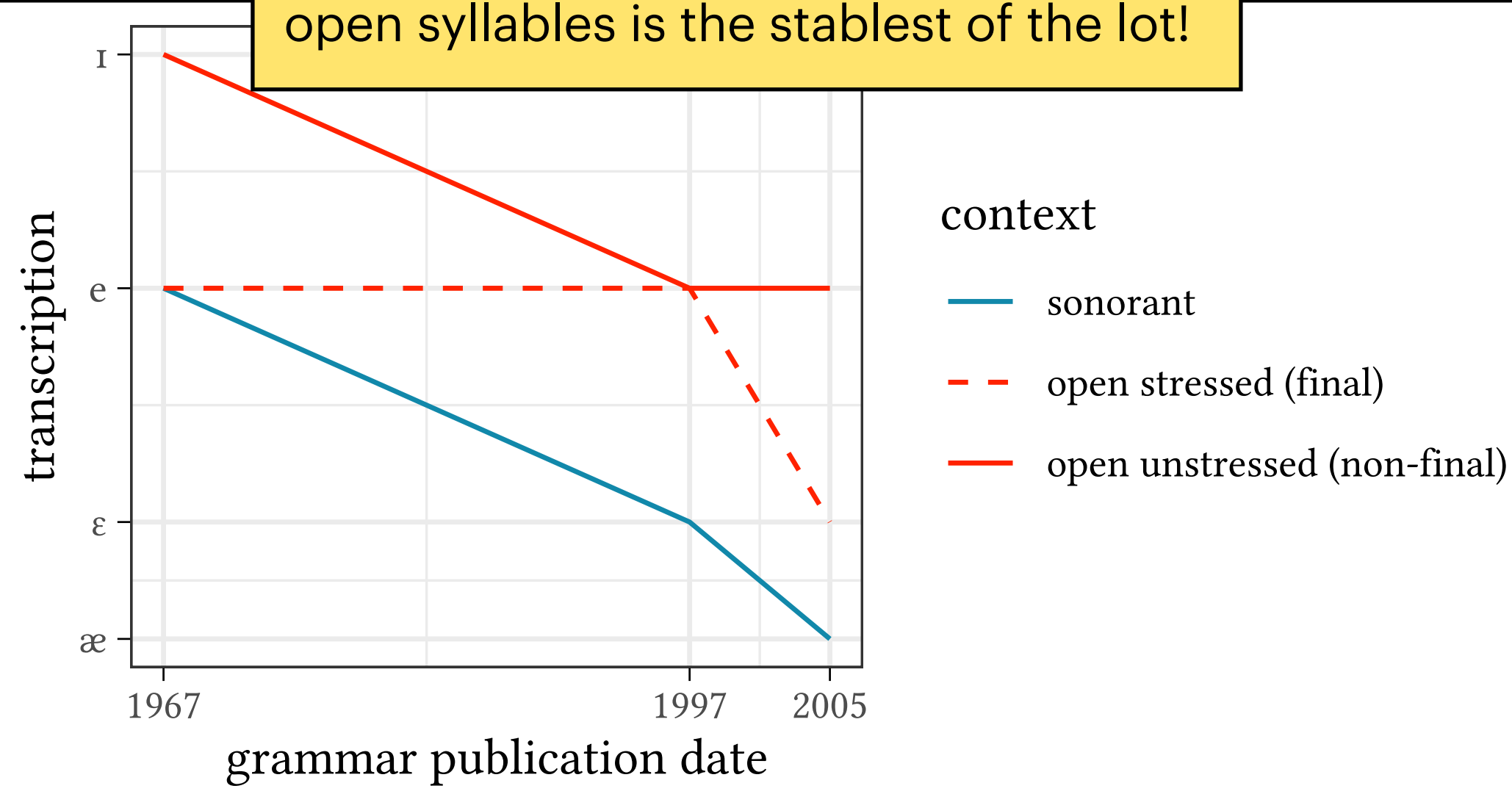
F2 – 2F1 to capture movement along the ‘front diagonal’ of the vowel space (see eg. Labov et al. 2013).

Data

/e/-realisations across environments



What the descriptive grammars seem to get wrong is 'what's moving' — /e/ in open syllables is the stablest of the lot!

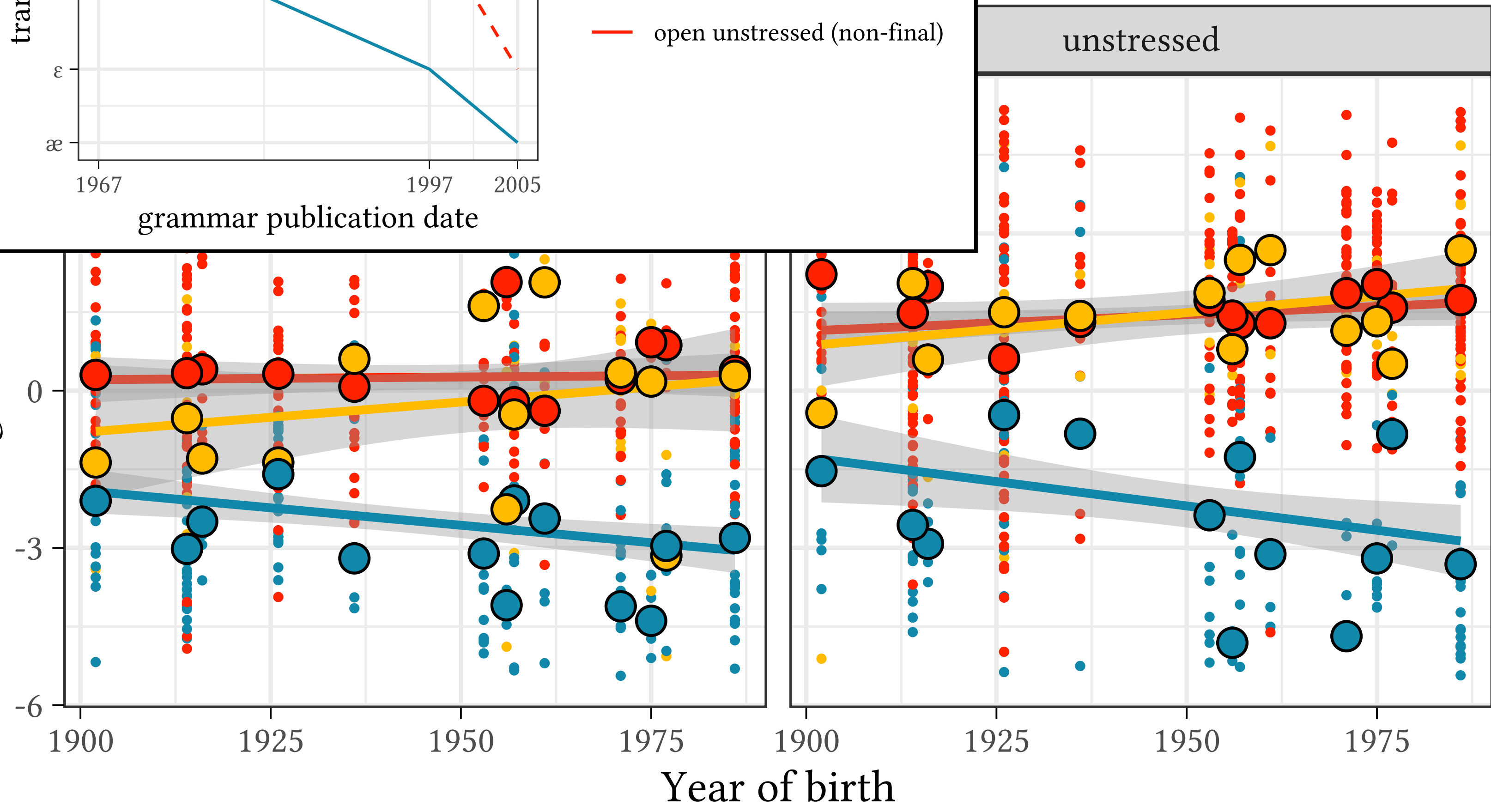


data

cross environments

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'Front diagonal' F2 – 2F1



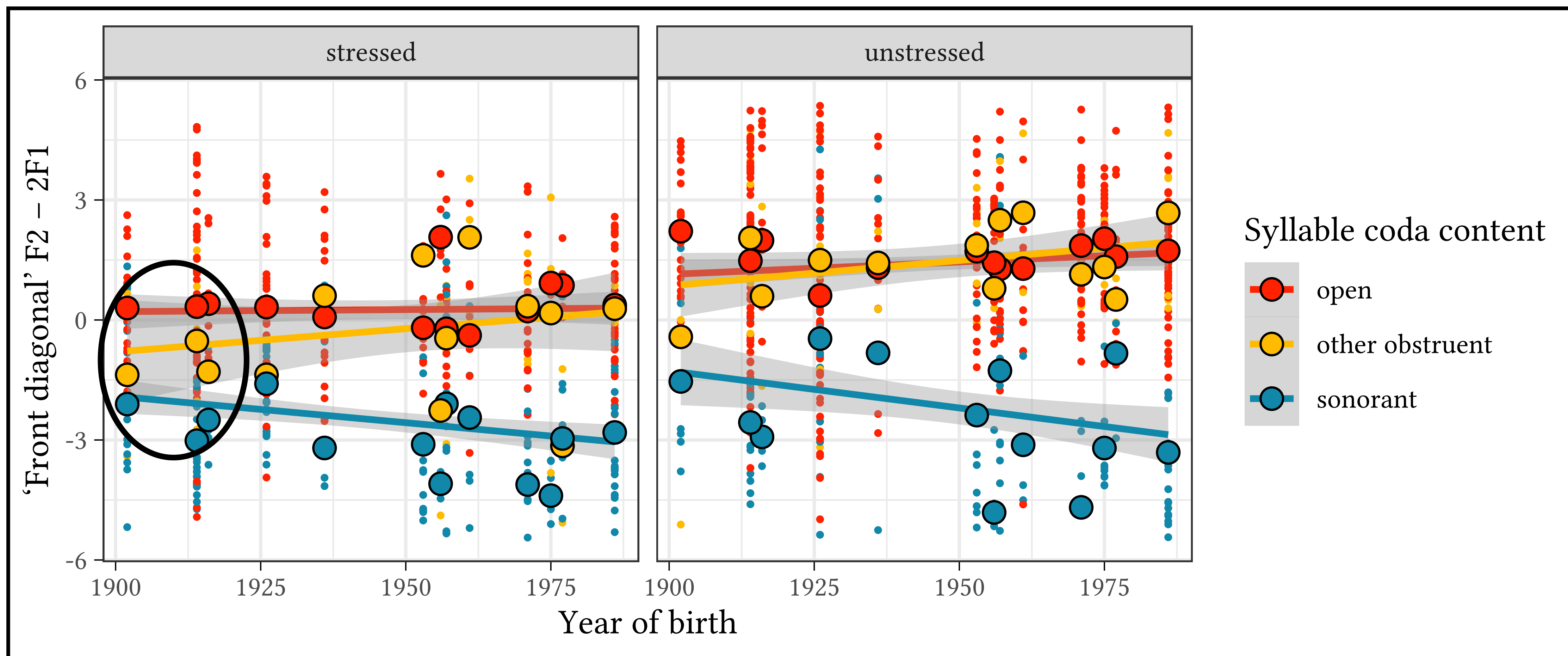
Syllable coda content

- open
- other obstruent
- sonorant

old system. closed syllables ≠ open syllables
irrespective of further environment?

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/e/-realisations across environments

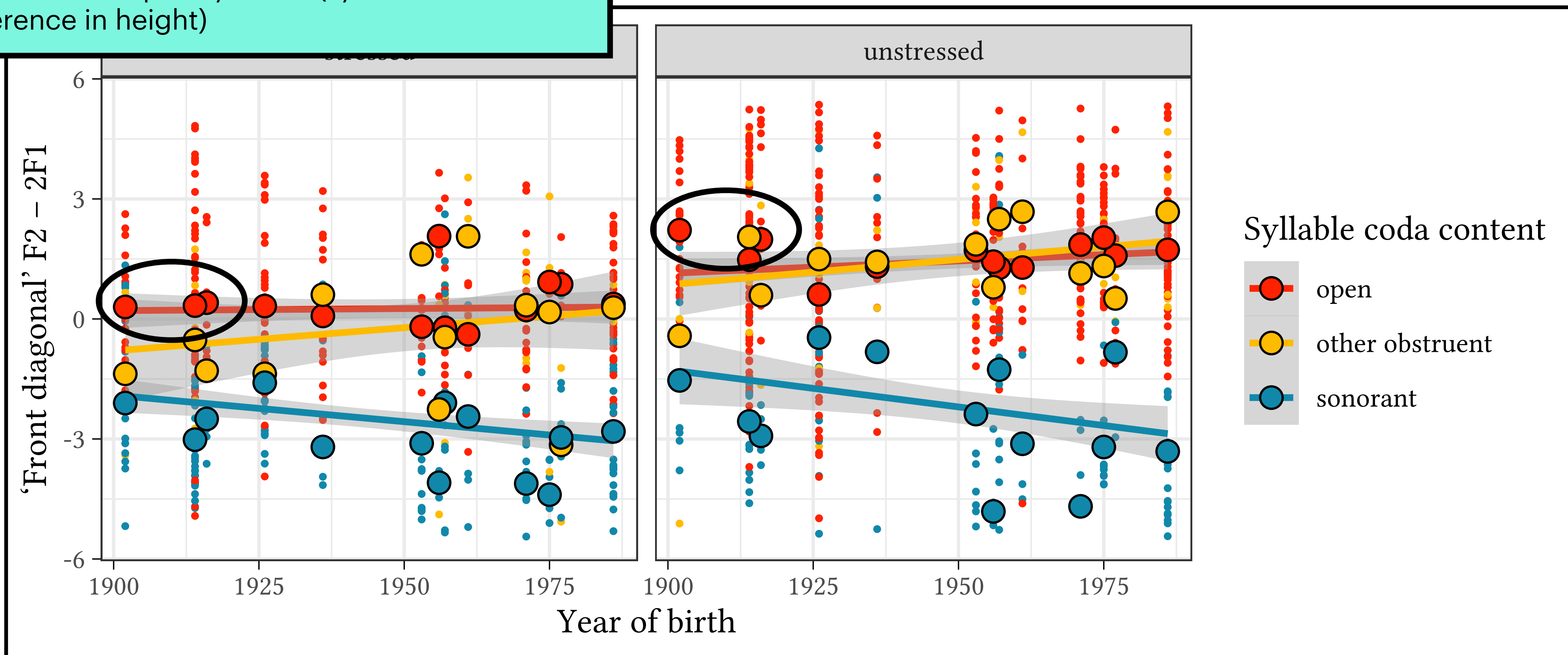


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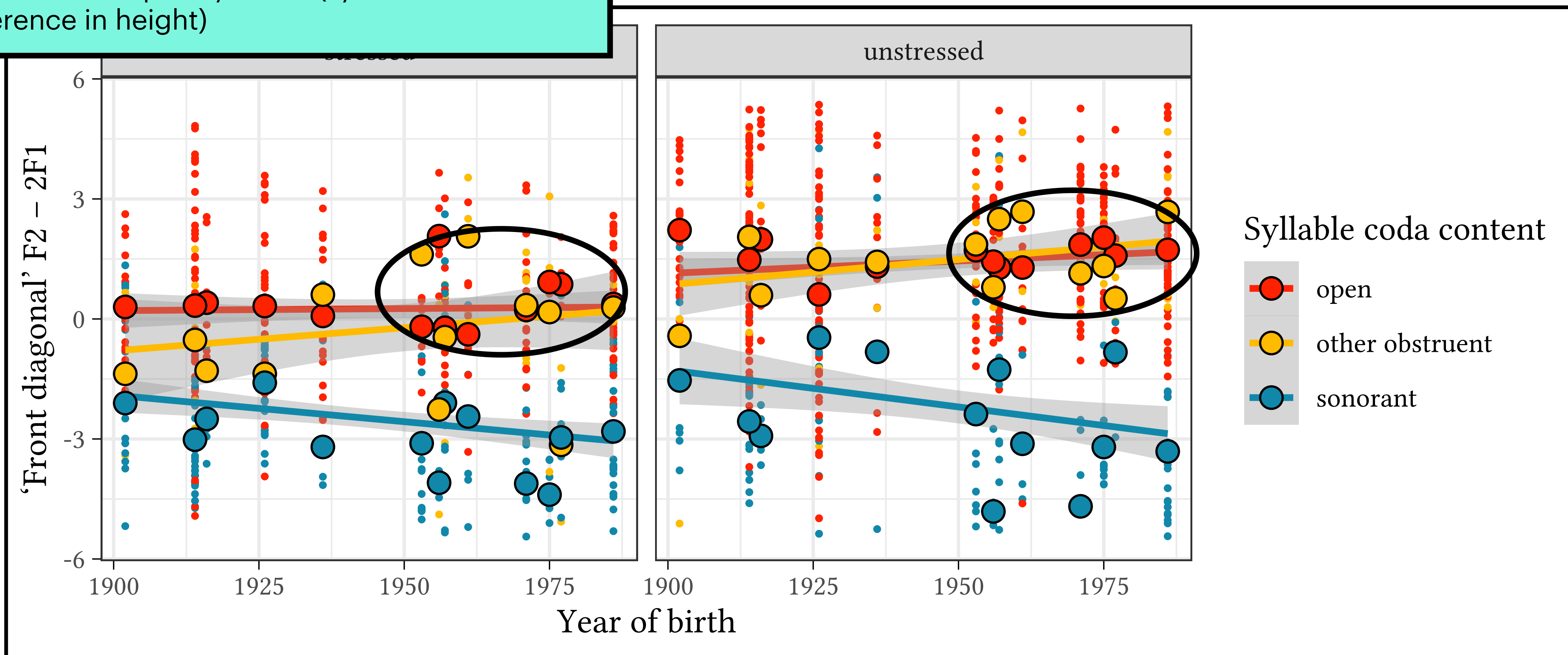
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new system. pre-obstruent \geq open? realisations in
obstruent contexts have actually systematically drifted
upwards.

variations across environments



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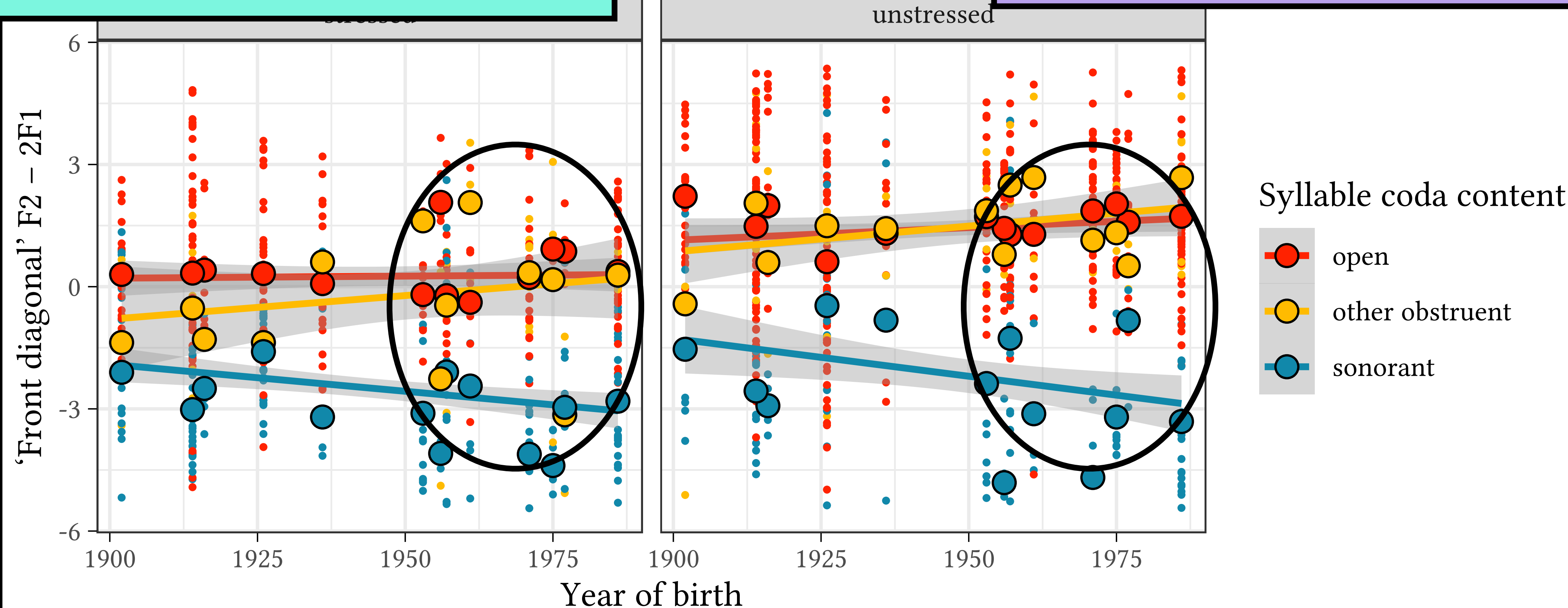
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Data

realisations across environments

new system. pre-obstruent \geq open? realisations in
obstruent contexts have actually systematically drifted
upwards.

new system. pre-sonorant realisations get
further and further away from everything else.



old system. closed syllables \neq open syllables
irrespective of further environment?

old system. possible to tell apart stressed &
unstressed in open syllables (systematic
difference in height)

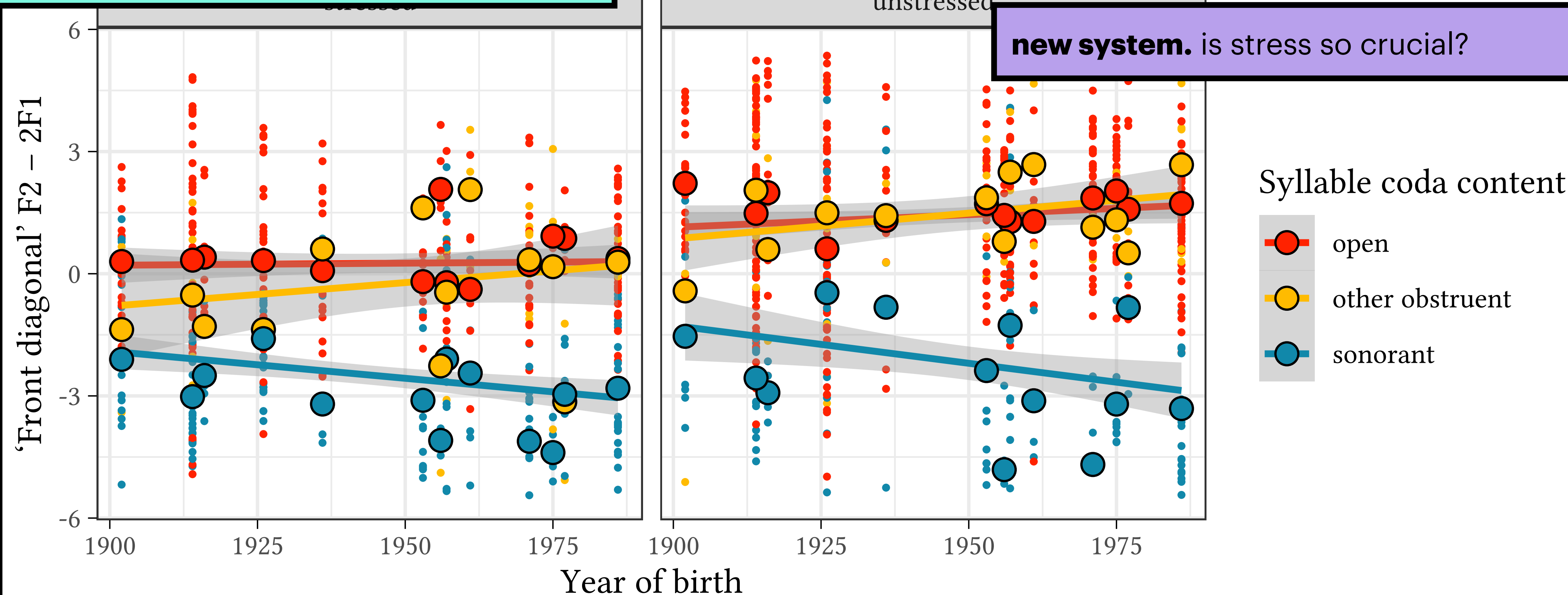
Data

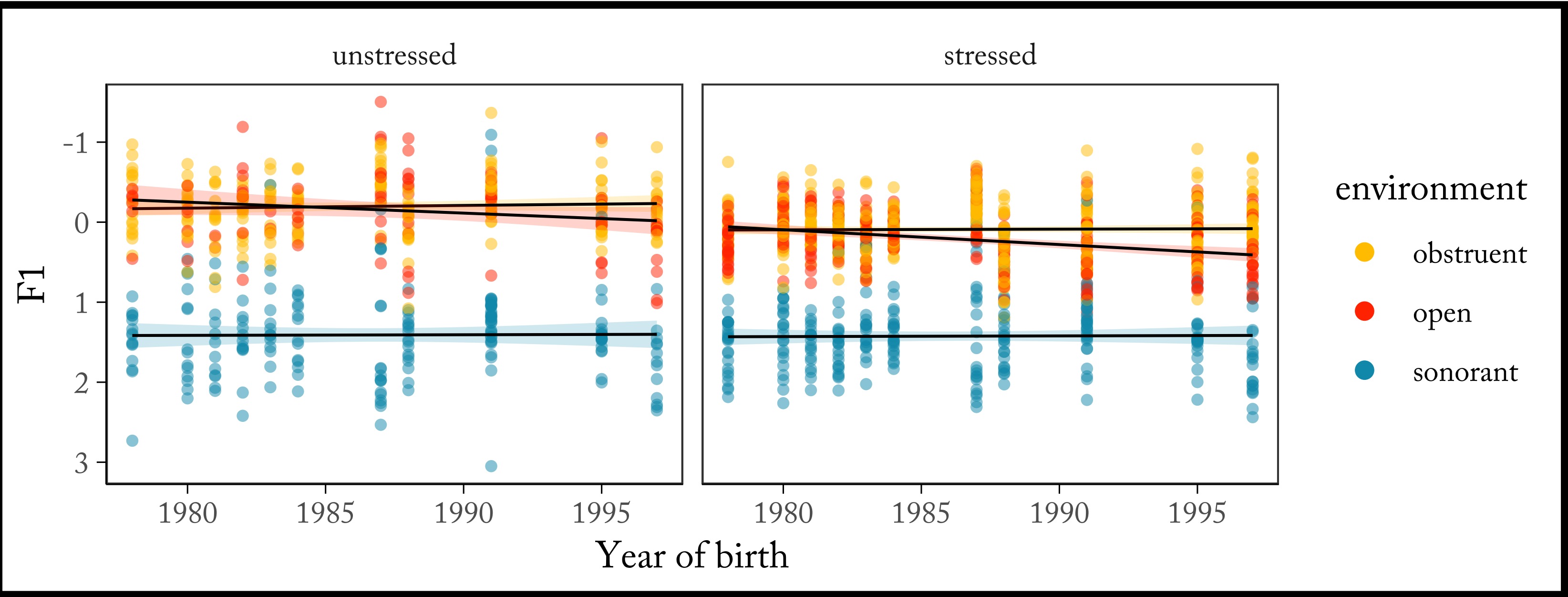
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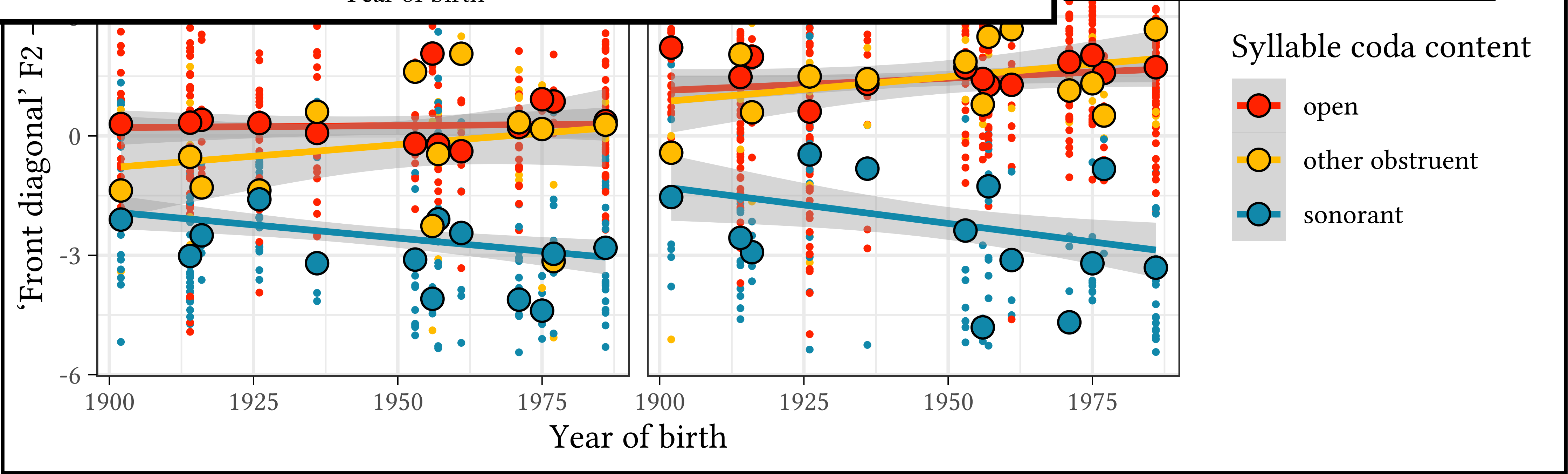
new system. pre-sonorant realisations get
further and further away from everything else.

new system. is stress so crucial?





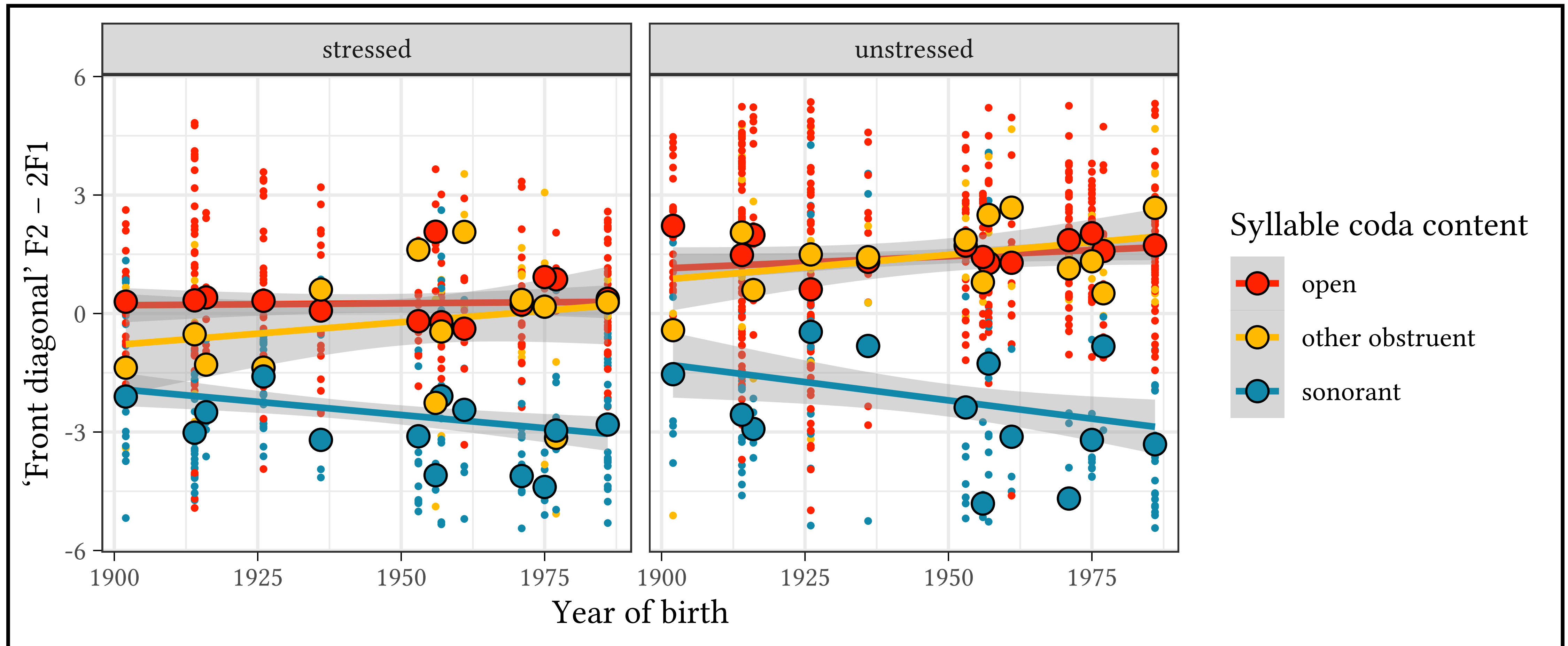
A vision of the future.
From our ms. (11 *female* speakers, **1980-1997**):
pre-sonorant realisations don't move very much
any more, pre-obstruent
realisations still working
on being the highest.



**What about individual coda
sonorants?**

Data

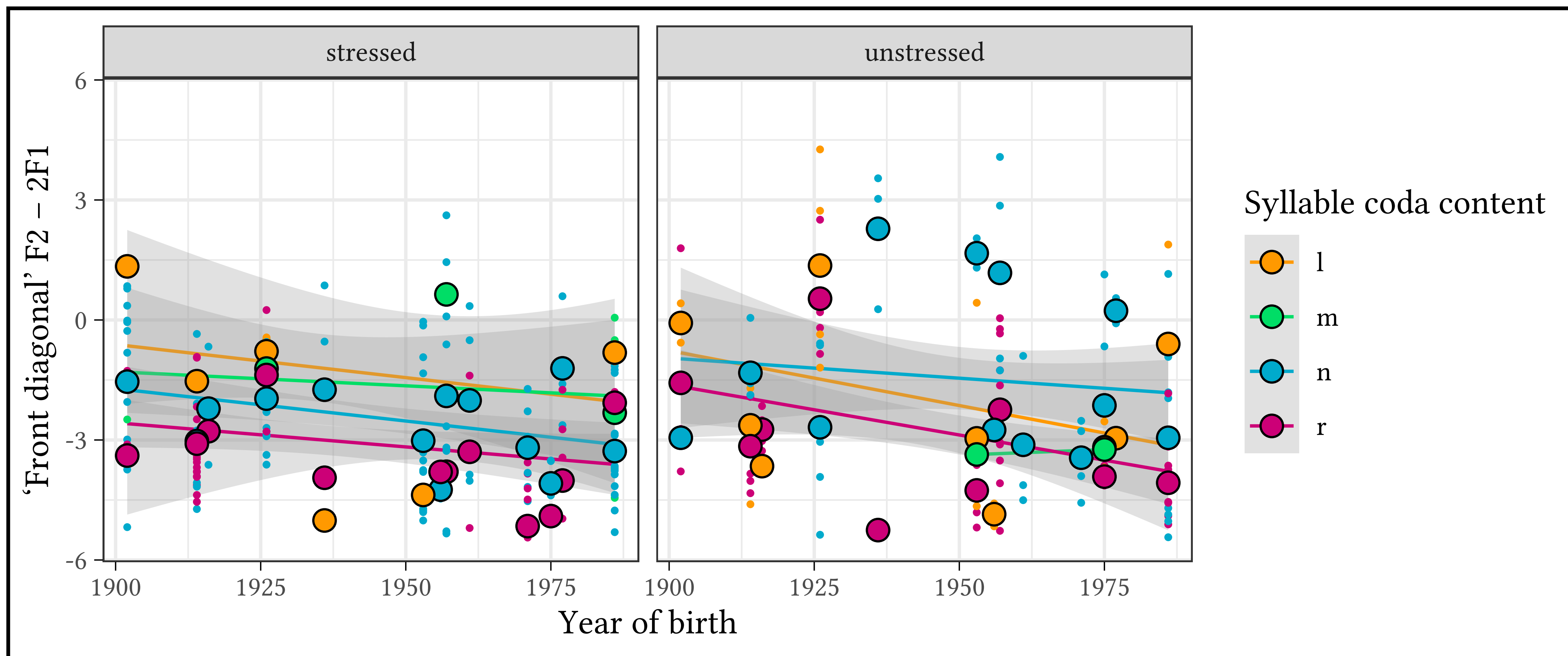
/e/-realisations across environments



What about individual coda sonorants? Differences between /n, l, m/ turn out **not** to be **statistically significant**, but /r/ is consistently ahead.

Data

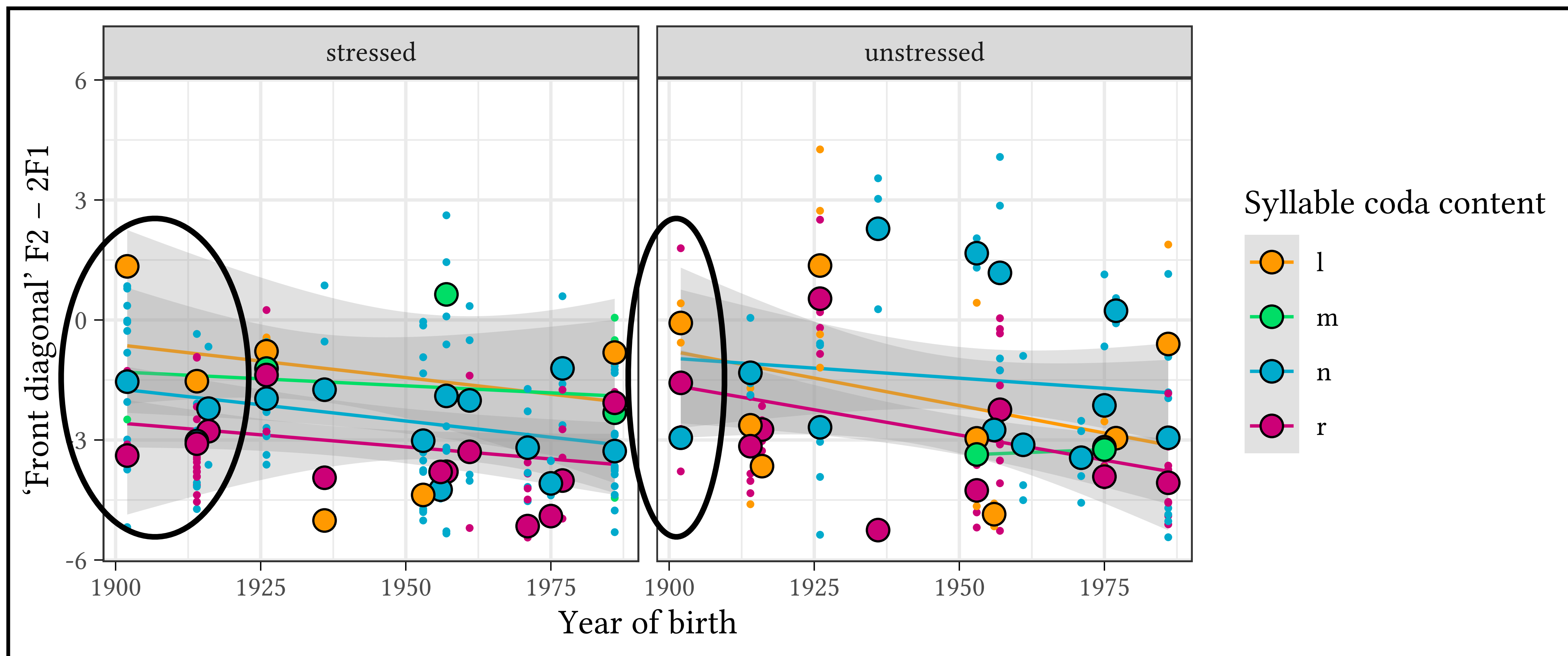
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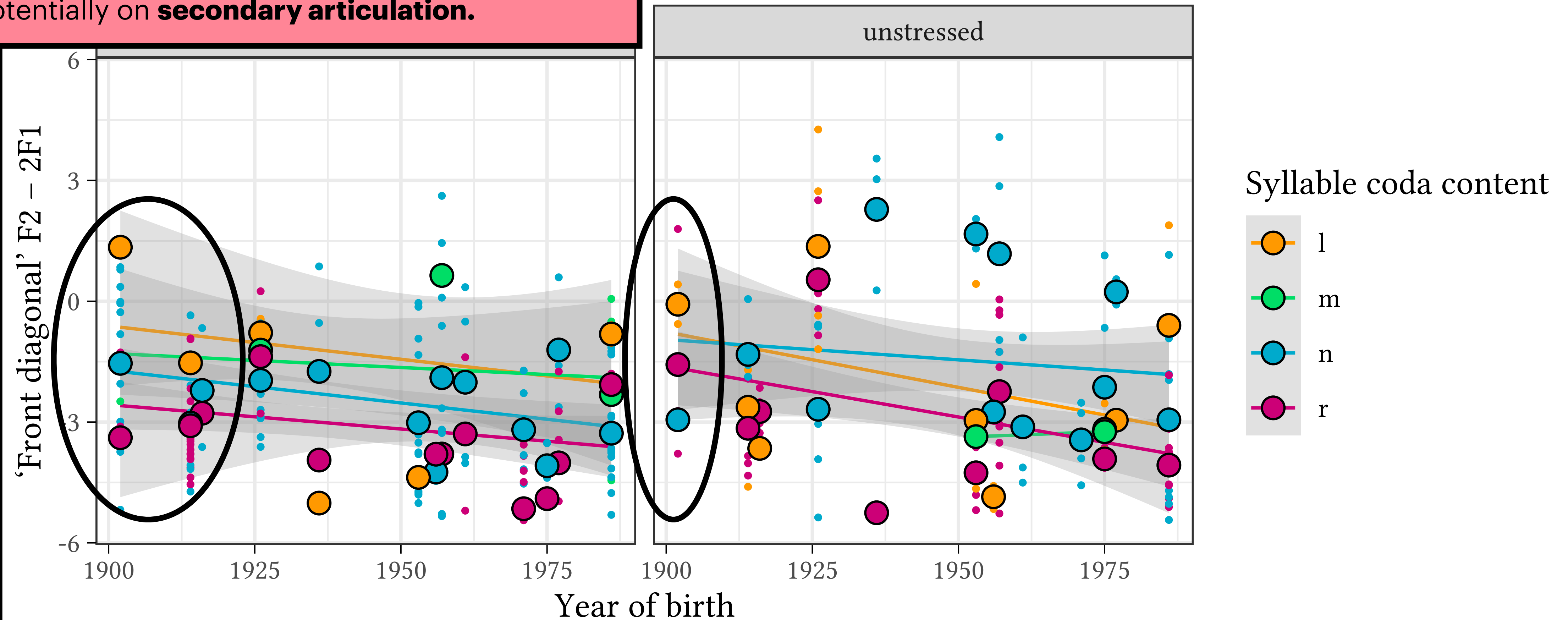


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We claimed earlier that the 'goodness' of the lateral as a precursor to change depended potentially on **secondary articulation**.

Data

tions across environments



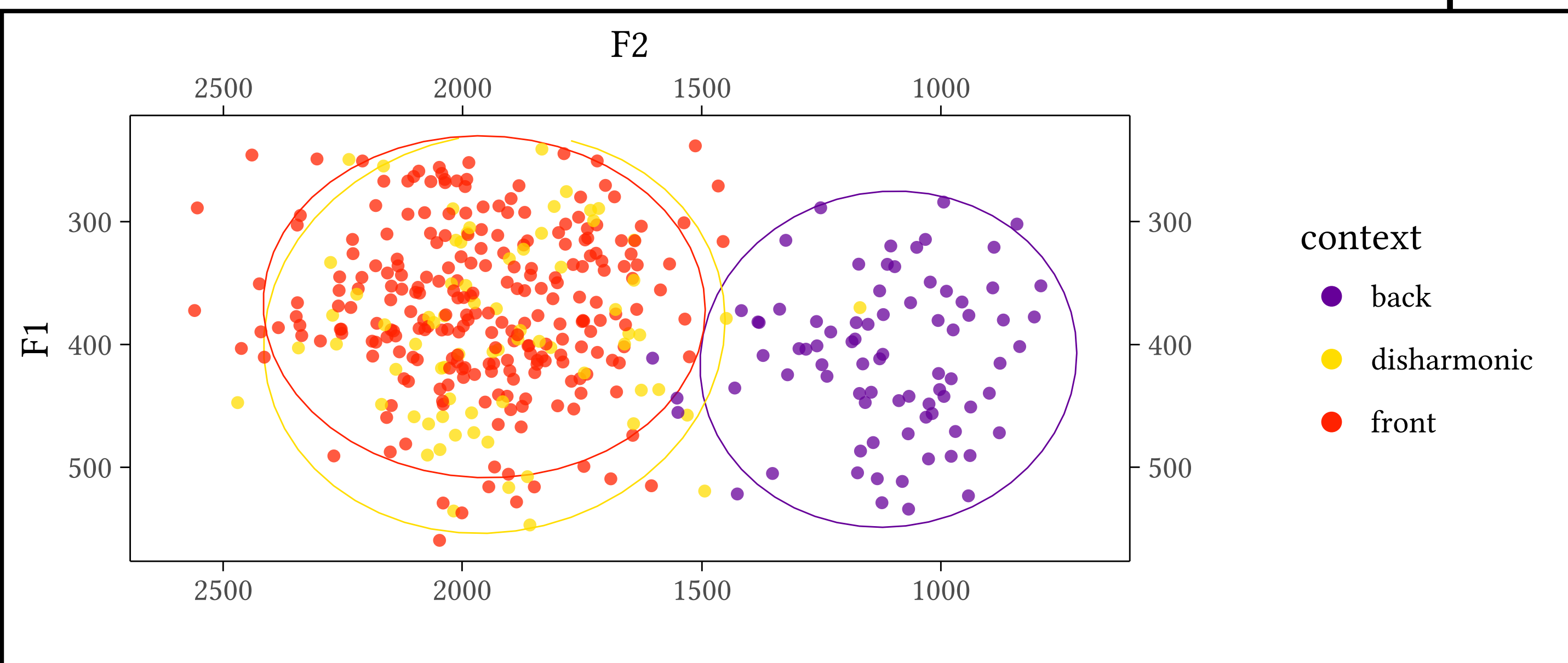
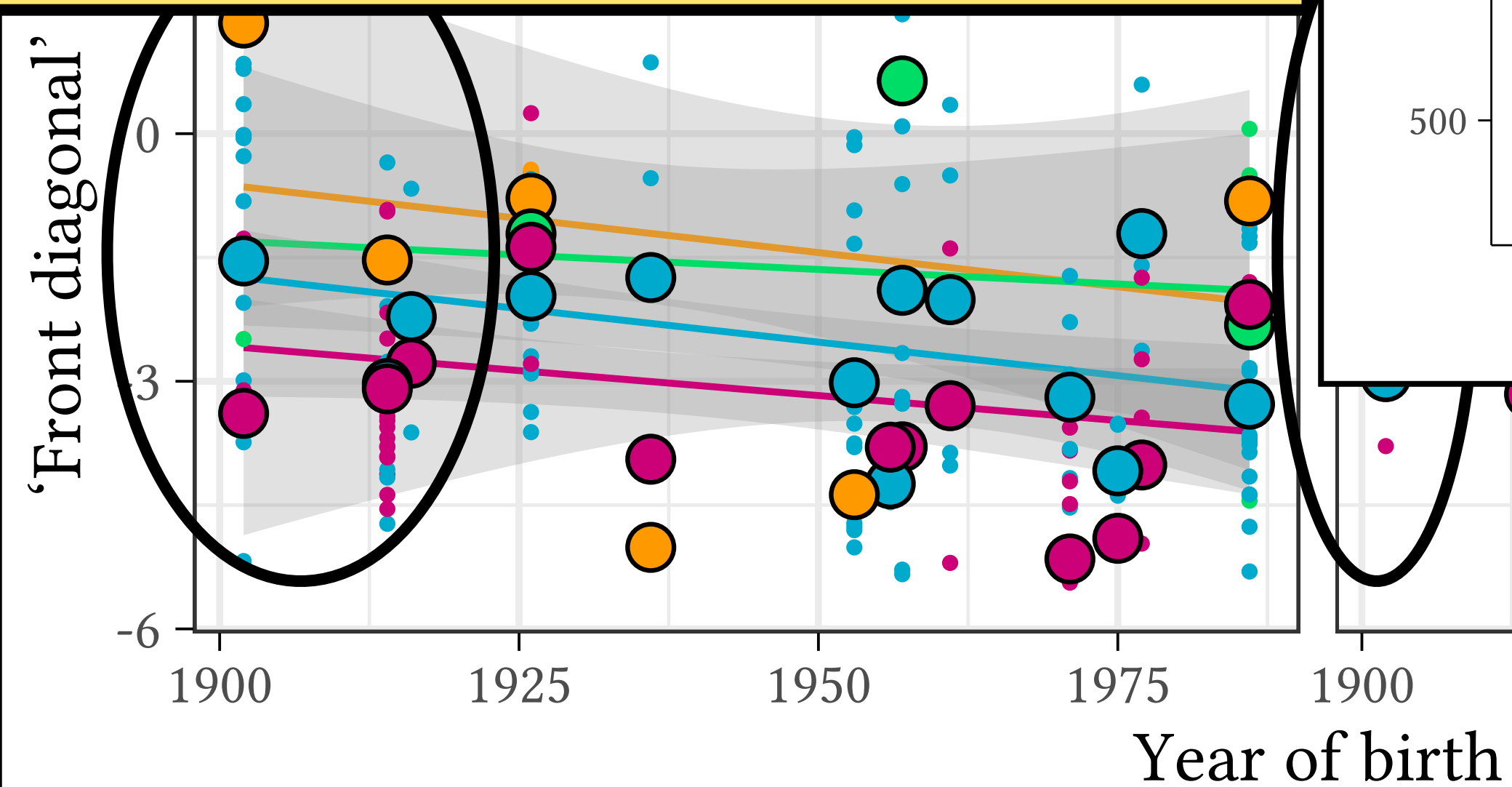
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Data

Changes across environments



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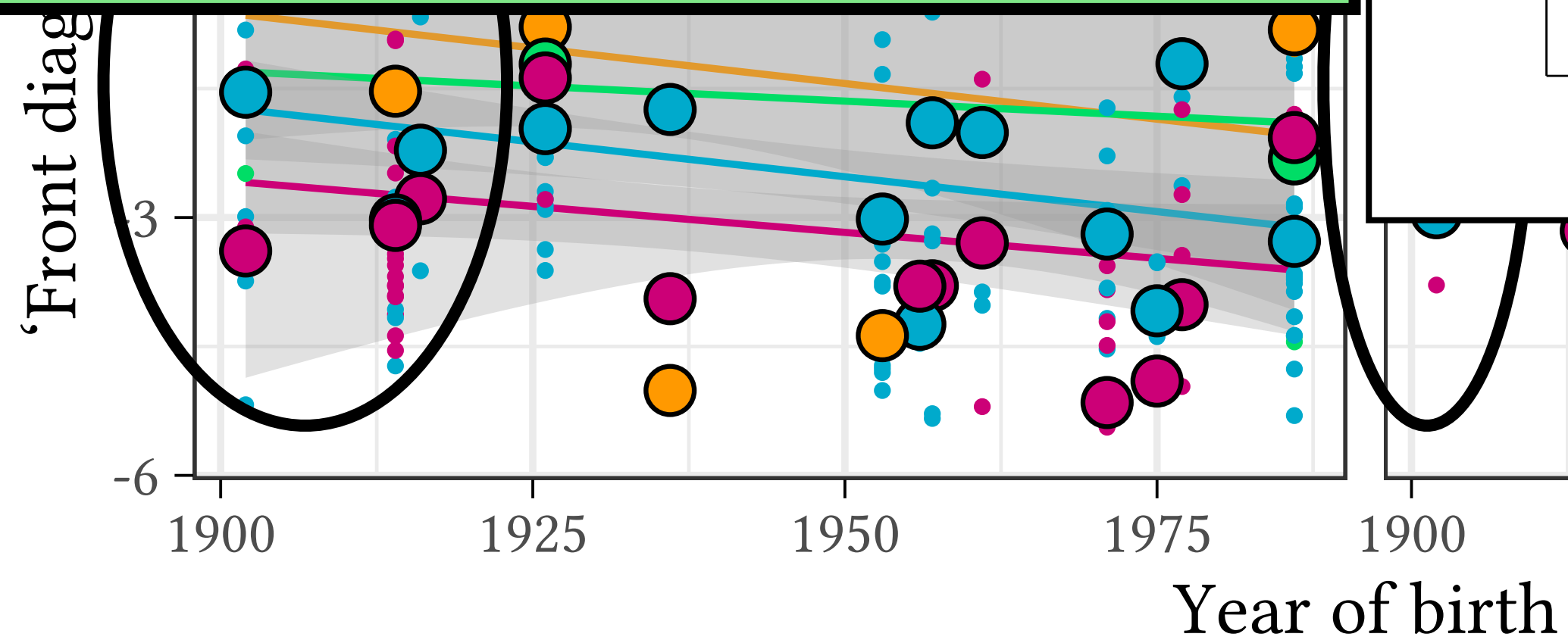
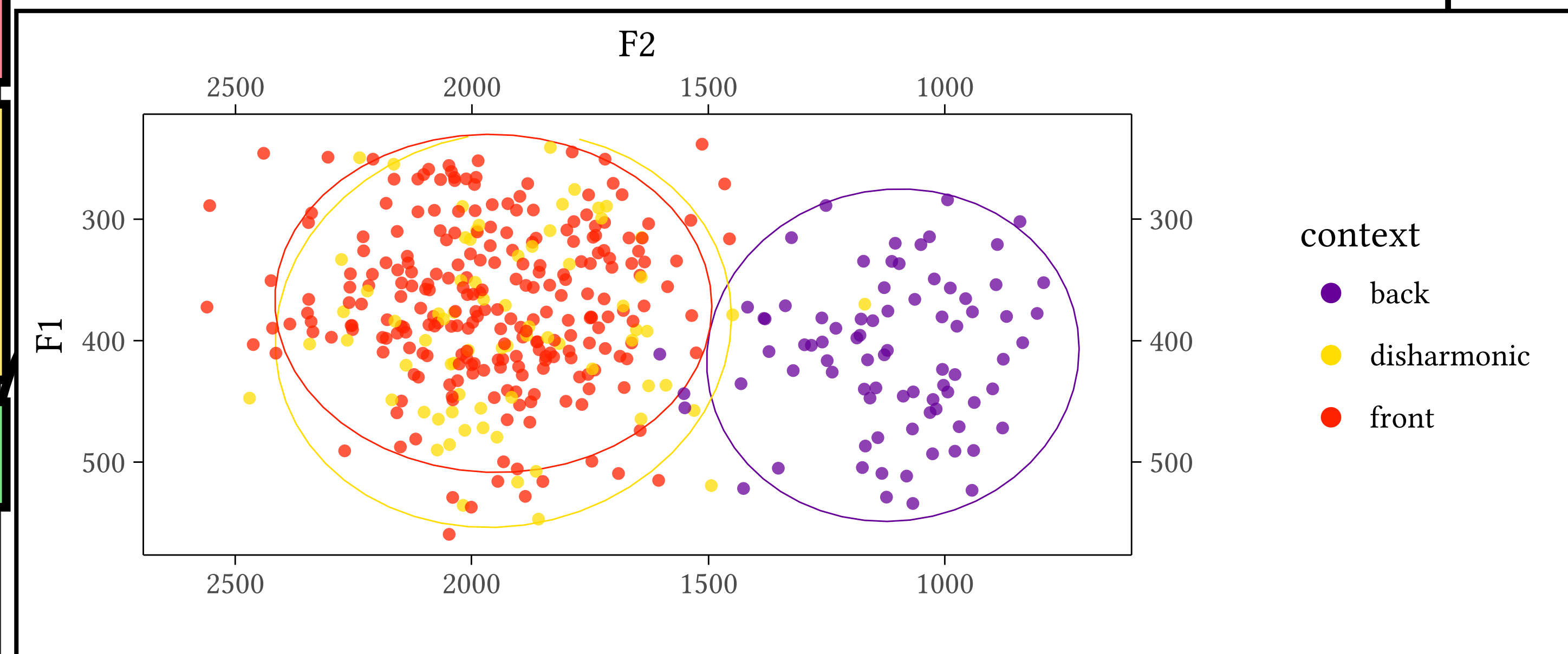
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Data

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Data

/r/ realizations across environments

What about /z/?

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Realizations across environments

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There wasn't that much /z/ in the corpus as analysed so far (not a high-frequency segment save in some morphology). In our previous study:

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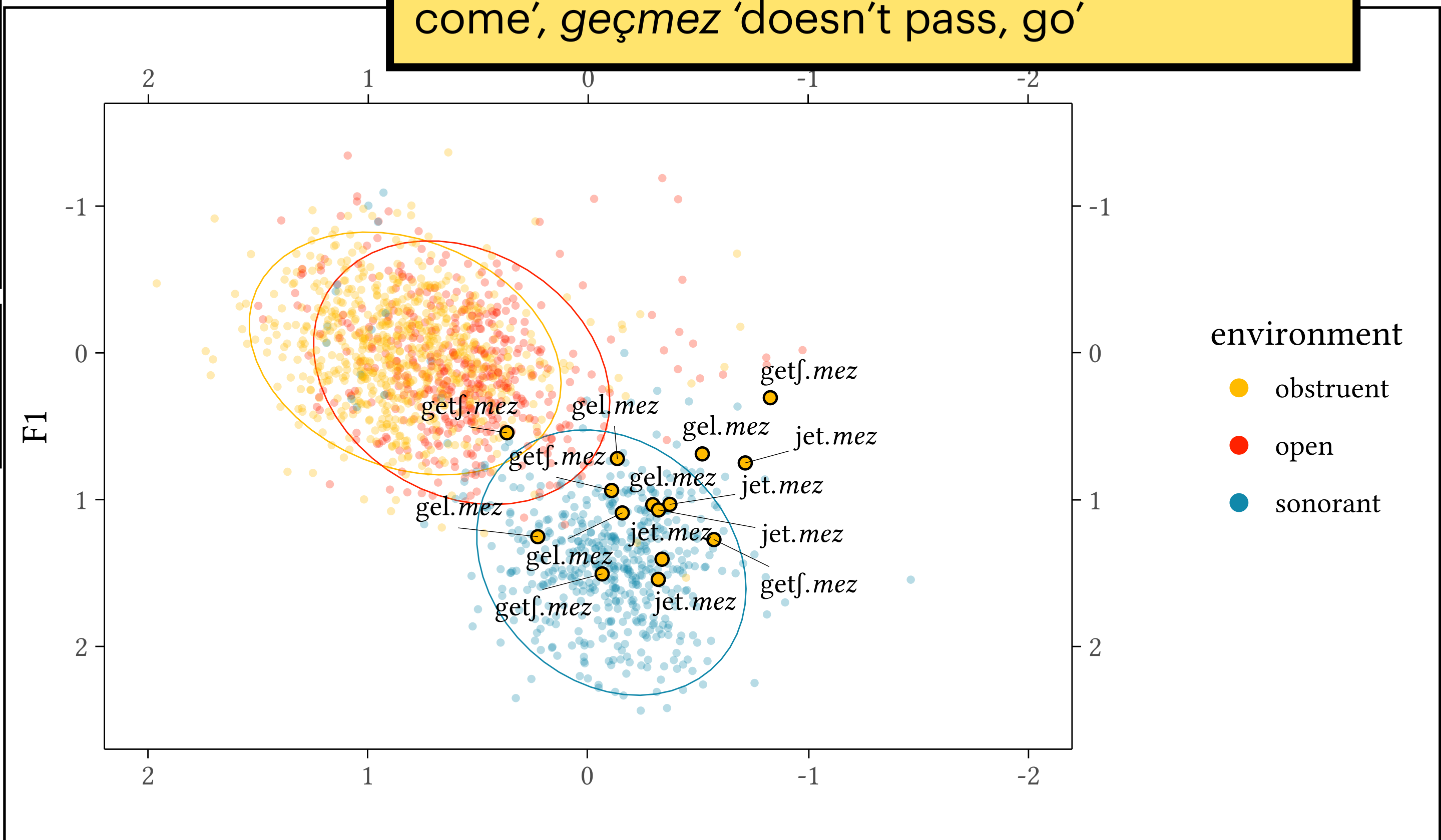
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(can't tell you about diachronic trajectory pre-z, but can at least demonstrate to you that it's real)

Data

Realizations across environments

yetmez 'doesn't suffice', gelmez 'doesn't come', geçmez 'doesn't pass, go'



Other sources of evidence

Regional variation

So far. Alternation exists; we have a bit of diachrony. Interested in putting together a slightly more large-scale picture.

Other sources of evidence

Regional variation

Western Anatolian rhoticity loss. An old example of compensatory lengthening triggered by syllable-final /r/-deletion (Korkmaz 1965; Sezer 1986; Kavitskaya 2002) in which there are incidentally additional /r/-triggered height effects, even when the rhotic is absent on surface. **But**, this is old data, so we can't be sure it's not just a version of what we have now.

Standard Turkish

var

verdi

giderler

pıfırır

verir

Western Anatolian

va:

væ:.di

gi.dæ:.læ:

pıfıræ:

virı:

‘there is’

‘s/he gave’

‘they go’

‘s/he cooks’

‘s/he gives’



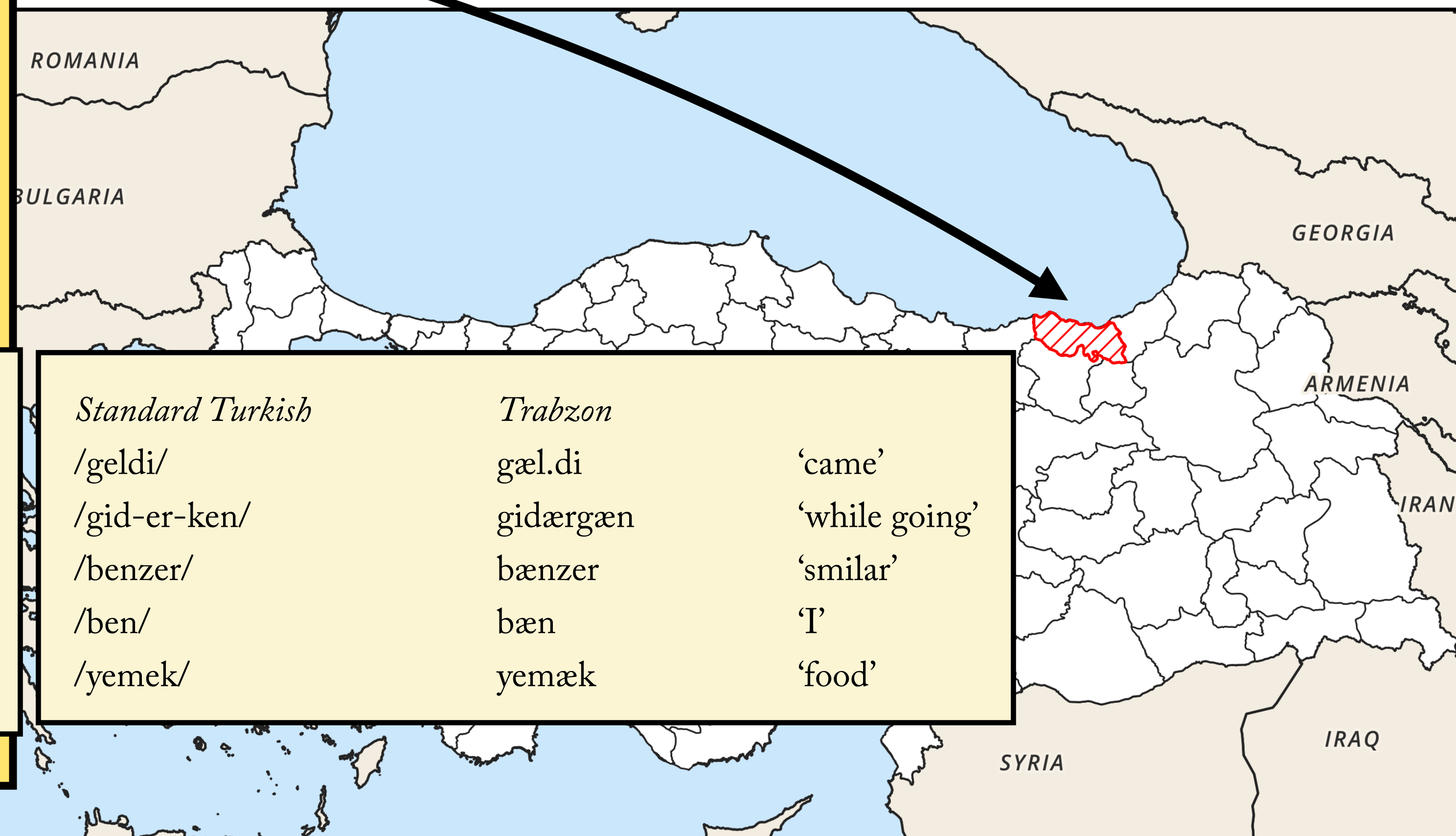
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Regional variation

Trabzon sonorants and velars. In traditional Eastern Anatolia, /e–æ/ is phonemic (as e.g. Azerbaijani); in Trabzon, Brendemoen (2002: 53, 55) describes an ongoing **merger to /i/** between phonemic /e/ and /i/, unless blocked by following /r l ɣ ŋ/ (= liquids + dorsals?), with further free variation between **[e]** and **[æ]** in pre-sonorant and pre-velar positions /r l k ɣ ŋ n/ excl. /m/.

<i>Standard Turkish</i>	<i>Trabzon</i>	
/erkek/	er.kek ~ er.kik	‘male’
/køp/ ⁸⁸	kep ~ kip	‘many’
/et/	et ~ it	‘do/reach’
/kel/	kel *kil	‘come’
/ejer/	ezer *ezir	‘saddle’

<i>Standard Turkish</i>	<i>Trabzon</i>	
/geldi/	gæl.di	‘came’
/gid-er-ken/	gidærgæn	‘while going’
/benzer/	bænzer	‘similar’
/ben/	bæn	‘I’
/yemek/	yemæk	‘food’



Typology & diachrony revisited

Summing up

The phenomenon. Front mid vowels /e/ and /ø/ undergo alternations conditioned by the following coda.

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 - Western Anatolian Turkish: don't generalise beyond the rhotic;
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Generalisation: both the standard and the Trabzon patterns involve an **active class that mixes sonorants and obstruents**, and which **does not necessarily respect the quality of the phonetic cues** corresponding to each environment.

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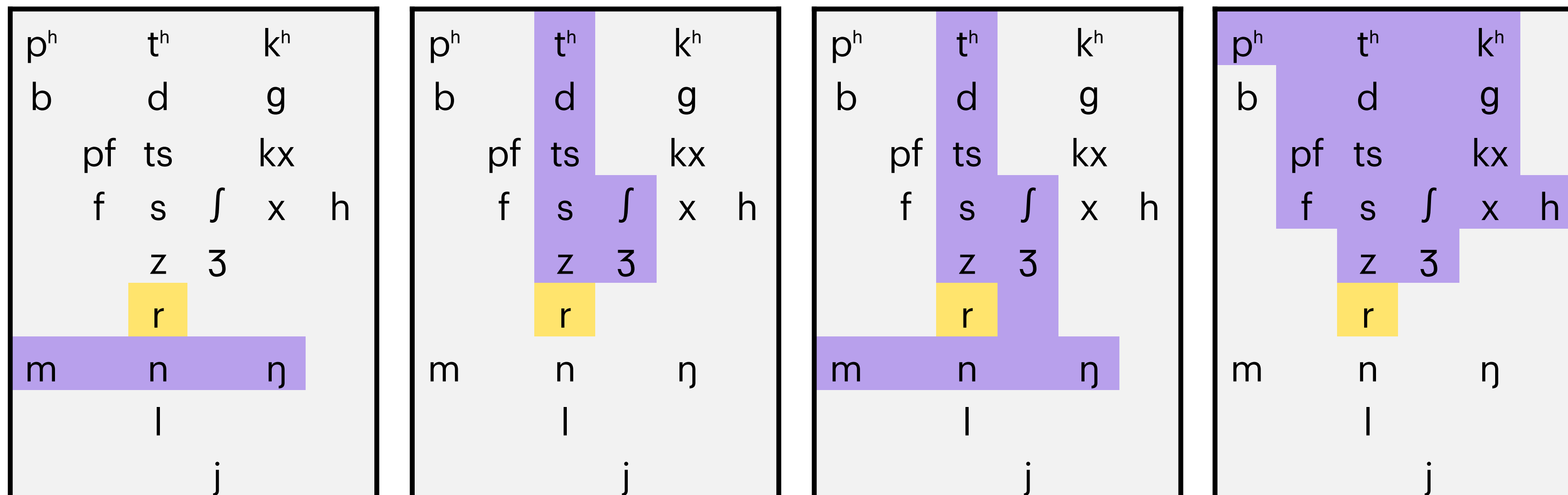
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Conjecture. 'Slightly weird classes' tell us something about the structure of phonologisation.

- In **Schaffhausen Swiss German** (Keel 1982, Janda & Joseph 2003), a rule which historically lowered pre-rhotic [o] to [ɔ] has undergone different generalisations in different villages.



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- In **Georgian**, syncope occurs in /VCV(C)/ sequences if the intervening /C/ is /m, n, l, r, v/, and optionally also /b/ (Butskhrikidze & van der Weijer 2001, Butskhrikidze 2002).

/mercxal-is/	[mercxlis]	swallow-GEN
/t'omara-it/	[t'omrit]	sack-INST
/ʃvel-is/	[ʃvlis]	deer-GEN
/bal-eb-i/	[blebi]	cherry-PL-NOM
/xed-av-a/	[xedva]	see-THEM-INF
/ʃe-i-p'χ'ar-ob/	[ʃeip'χ'rob]	‘you will arrest’
/ga-tʃ'er-i/	[gatʃ'ri]	‘you will cut’
/xar-av-a/	[xvra] ⁶⁶	gnaw-THEM-INF

/k'ak'ab-is/	[k'ak'bis]	partridge-GEN
/xoxob-is/	[xoxbis]	pheasant-GEN

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Extend over the full consonantal inventory of the language; Trabzon Turkish and ST *make different decisions about what the most legitimate extension is.*

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Even wilder **conjecture**. This is about decision functions denoting similarity to the trigger ...

Teşekkür ederiz!
Jättetack!
Go raibh maith agat!

Special thanks to:

Turkish speakers we worked with in Manchester 2016–2017

Yuni Kim, who has heard more about this data than anyone should have to