

Vowel Harmony in Djibouti Somali

Preliminary notes from fieldwork

Nicola Lampitelli¹ Christopher R. Green²

¹LLL UMR 7270
Université de Tours, CNRS
nicola.lampitelli@univ-tours.fr

²Syracuse University
cgreen10@syr.edu

29 March 2022
Online Somali Seminar

Empirical problem

Empirical problem

(1) Aïm (1999, 1)

- a. $tɔɔs + aa = tɔɔsaa$ 'I get up'
- b. $bʁʁd + aa = tʁʁsææ$ 'I jump'

Intro: vowel harmony in Somali

Empirical problem

- Vowel Harmony (VH) in Somali has been acknowledged for since Armstrong (1934), and described by Andrzejewski (1955), Saeed (1993), Angoujard and Hassan (1991), Aïm (1999), Mohamoud (2013), Kimper et al. (2019), Nilsson and Downing (2019), Green (2021).
- Aïm (1999) and Mohamoud (2013) are the only studies presenting analyses of VH.
- Yet, VH is still not fully understood with respect of (1) its domain(s) of application, (2) inter- and intra-speaker variation, and (3) variation across dialects of Somali.

Outline

1. Vowel harmony in Somali
2. The speakers and the corpus
3. Description of our speakers' vowels
4. Discussion and further perspectives

Outline

1. Vowel harmony in Somali
2. The speakers and the corpus
3. Description of our speakers' vowels
4. Discussion and further perspectives

Vowel harmony in Somali

To contribute to the debate:

- We collected data from four speakers in Orléans in January, 2022.
- These speakers are all from Djibouti, and are in their twenties.
- Two speakers seem to have more prototypical VH patterns, whereas the other two diverge.
- Our data provide additional insight to Nilsson & Downing's (2019) recent analysis of two speakers' patterns of VH

Vowel harmony in Somali

What we know about VH:

(2) Two series of vowels

a. [-ATR] /i, ε, a, ɔ, u/

b. [+ATR] /i, e, æ, ɾ, ʊ/

- The contrast is sometimes lexical (i.e., a given root is associated with vowels from one series or the other)
- And sometimes triggered by presence of vowels of the other series within the same syntactic domain

Nilsson and Downing (2019) refer to (2-a) as ‘neutral’ series and to (2-b) as the ‘culus’ series.

Vowel harmony in Somali

Examples of lexical contrast (data from Green 2021, 55)

/ɪ/	<i>díb</i>	'back'	/i/	<i>ríd</i>	'hurl'
	<i>íb</i>	'orifice'		<i>íbí</i>	'afterbirth'
/ɛ/	<i>dég</i>	'peak'	/e/	<i>dég</i>	'alight'
	<i>edéb</i>	'politeness'		<i>éb</i>	'complete'
/a/	<i>xád</i>	'steal'	/æ/	<i>xád</i>	'border'
	<i>cád</i>	'white'		<i>cád</i>	'piece of meat'
/u/	<i>búg</i>	'forgery'	/ʊ/	<i>búd</i>	'grave'
	<i>súg</i>	'make clear'		<i>súg</i>	'wait'
/ɔ/	<i>ór</i>	'chant (n.)'	/ɤ/	<i>ór</i>	'rag'
	<i>caáro</i>	'spider'		<i>caádo</i>	'custom'

Table: [-ATR] vs. [+ATR] in short vowels

Vowel harmony in Somali

Examples of lexical contrast (data from Green 2021, 56)

/ɪɪ/	<i>díin</i>	'religion'	/ii/	<i>díin</i>	'turtle'
	<i>iimáan</i>	'chief'		<i>iimáan</i>	'belief'
/ɛɛ/	<i>feér</i>	'rib'	/ee/	<i>fээр</i>	'punch'
	<i>eég</i>	'look at'		<i>éeg</i>	'present time'
/aa/	<i>ammáan</i>	'security'	/ææ/	<i>ammaán</i>	'praise'
	<i>saán</i>	'animal hide'		<i>saámi</i>	'share (n.)'
/uu/	<i>búuq</i>	'noise'	/uu/	<i>búug</i>	'book'
	<i>duúl</i>	'fly'		<i>duúl</i>	'attack'
/ɔɔ/	<i>doón</i>	'want'	/ɔɔ/	<i>doón</i>	'boat'
	<i>dóob</i>	'bachelor'		<i>doóbi</i>	'milking vessel'

Table: [-ATR] vs. [+ATR] in long vowels

Vowel harmony in Somali

VH within a given domain: the “word”:

- | | | | | | |
|---|--------|--------|------|--------|------------|
| 1 | [-ATR] | tɔɔs + | aa = | tɔɔsaa | ‘I get up’ |
| 2 | [+ATR] | bɾɾd + | aa = | tɾɾsææ | ‘I jump’ |

Table: VH in inflected verb forms (identical to 1)

- | | | | | | |
|---|--------|-------|-----|------|------------------|
| 1 | [-ATR] | bad + | ɔ = | badɔ | ‘seas’ |
| 2 | [+ATR] | ʃæd + | ɔ = | ʃædɾ | ‘pieces of meat’ |

Table: VH in inflected noun forms (Armstrong 1934, 150-151)

- In both contexts, VH is triggered by the ATR specification of the root.
- In both contexts, VH spreads rightwards.

Vowel harmony in Somali

VH within a given domain (Examples from Andrzejewski 1955, 569-570):

1	[-ATR]	waa	saan	faras	'It is a horse's skin'
2	[+ATR]	wææ	sææn	dibi	'It is a bull's skin'

Table: VH in waa-phrases

3	[-ATR]	ma	ʃabɛɛl	baa	'Is it a leopard?'
4	[+ATR]	mæ	libææħ	bææ	'Is it a lion?'

Table: VH in ma...baa questions

- In both contexts, VH is triggered by the noun.
- Yet, in 1-2, the trigger is phrase-final, whereas in 3-4 it appears between *ma* and *baa*: directionality of VH is not consistent.

Vowel harmony in Somali

Andrzejewski (1955, 569-570) reports cases in which VH is triggered by something other than a noun:

1	[-ATR]	sɔɔrtii	baj	karijɛɛn	'They cooked the food'
2	[+ATR]	sɔɔrtii	bææn	kærijæj	'I cooked the food'

Table: VH triggered by the subject pronoun

3	[-ATR]	kanu	waa	dameɛrkaagii	'This is your (sg) he-donkey'
4	[+ATR]	kænu	wææ	dæmeerkiisii	'This is his he-donkey'

Table: VH triggered by the possessive

- In both cases, VH is triggered by prosodically-dependent affixes, attached to either the focus particle *baa*, or the noun.
- In both cases, VH spread (both to the left and the right) to the entire phrase.

Vowel harmony in Somali

The following example from Andrzejewski (1955, 570) shows that [+ATR] noun *ħilib* does not harmonize when the trigger is [-ATR]

1	ħilib	/	kaa	kari		'Cook that meat'
	[+ATR]		<<	[-ATR]		
2	ħilib		kææ	sɾɾ	iibsɾ	'Buy that meat'
			<<	[+ATR]		

Table: VH does not affect the noun

- This is in favor of [+ATR]'s dominance over [-ATR] (see Aïm 1999, 27-ff, Mohamoud 2013, 51-ff)
- The reverse situation (i.e., [+ATR] blocked by a noun lexically marked as [-ATR]) never occurs.
- Unless...

Vowel harmony in Somali

Andrzejewski (ibid.), but also Aïm (ibid.:29-30), claims pauses can block VH:

1	bɛertii (P)	mæ	sɾɾ	iibsætæj	'Have you bought the garden?'
	[-ATR]		<<	[+ATR]	
2	beertii	mæ	sɾɾ	iibsætæj	Same meaning
			<<	[+ATR]	

Table: VH impeded by a pause (P)

- This example shows that dominant [+ATR] feature is blocked by a pause between the first element and the remaining part of the clause.

Nilsson & Downing (2019)

Nilsson and Downing (2019), stemming from the same assumptions we've just discussed, aim to determine whether it is possible to postulate a domain of application of VH, or not.

- N&D (2019) interview three speakers: one from Kismaayo, two from Mogadishu.
- They present new minimal pairs and an acoustic analysis of vowel contrasts.
- Look for harmonization in a variety of contexts.
- Propose that VH domain is a prosodic unit between PWd and PPh: the “complex word group”.

Vowel harmony in Somali

What we know so far:

- 1 The opposition [+ATR] vs [-ATR] is distinctive and identifies lexical items in (near) minimal pairs.
- 2 Yet, VH is triggered by dominant [+ATR], [-ATR] being recessive.
- 3 VH domains are (i) the root + suffixes, and (ii) a phrase headed by a noun or a verb.
- 4 Affixes may also trigger VH.
- 5 Pauses and speech rate may influence VH.
- 6 Intra- and inter-speaker variation occurs.

Outline

1. Vowel harmony in Somali
2. The speakers and the corpus
3. Description of our speakers' vowels
4. Discussion and further perspectives

The speakers

- SM, male, born in Dikhil in 1997, BA in English at the Université de Djibouti in 2018. Moved to France for MA at the Université du Havre (Normandie). Both families are Somali-speaking.
- MH, male, born in Djibouti-ville in 1992, BA in industrial studies in 2016 at the Université de Djibouti. Moved to France for an MA in biomedical sciences at the Université de Rouen (Normandie). Both families are Somali-speaking.
- AZ, male, born in Djibouti-ville in 1998; BA in French literature at the Université de Djibouti. Moved to France to study Linguistics at the Université de Metz (Lorraine). Both families are Somali-speaking.
- IS, male, born in Ali Sabieh in 1996; BA in French literature at the Université de Djibouti. Moved to France to study Linguistics at the Université de Tours. Both families are Somali-speaking (his father's family is from Jigjiga).

The recording

Data collection

- Data was collected on January 10th, 2022 in Orléans (Centre) by NL.
- Recording took place at IS and AZ's place in central Orléans.
- The four speakers were present during each session.

Procedure

- Each speaker was asked first to read the corpus (6 tasks, see below) to see whether he knew each word/phrase.
- In some cases, all the speakers agreed that a particular word is not used in Djibouti.
- Then, each speaker was recorded while reading each word or phrases twice in row.

The corpus

- The corpus is based on CG's work for the Somali grammar (Green 2021, 53-65) in 2020.
- For that purpose, CG interviewed three speakers: two from Mogadishu and one from Bu'ale.
- As acknowledged by CG, words targeted for data collection were selected based on harmony series identified in Nilsson & Downing's corpus (see Nilsson and Downing 2019 and Green 2021, 54)

The corpus: task 1

- Task 1 is designed to test lexical contrast between neutral vs culus vowels, in both V and VV contexts.
- Is divided into four parts, as the logical possibilities given two series and short/long vowels.
- The targets are all monosyllables.

The corpus: task 1

bil	moon, month
fin	pimple
tin	hair
hel	find
bed	area (math)
deg	peak
kan	this
dad	people
dan	objective
gub	burn
bug	forgery
run	truth
qor	write
qod	dig
qof	person

Figure: Task 1: expected neutral V series

The corpus: task 1

dib	back
ri'	goat
nin	man
bes	enough
dheg	ear
ded	roof, cover
rag	men
tag	go
cad	piece of meat
sug	wait
sun	poison
tun	nape of neck, hit
hog	hole
bog	side, belly
tog	river bed

Figure: Task 1: expected culus V series

The corpus: task 1

diin	religion
liin	lemon
hiil	cheer for a team
beer	liver
deeq	donation
dheel	joke, game
baal	feather
daar	switch on
dhaar	oath
nuug	suckle
nuur	light
quun	tonsil
boog	scab
dood	discussion
doon	want, find

Figure: Task 1: expected neutral VV series

The corpus: task 1

diin	turtle
fiid	dusk, peak, tip
jiin	edge
eed	aunt
feer	fist, to punch
geed	tree
baad	food
daan	cliff
daar	building
buug	book
duul	attack
guur	marriage
bood	jump
doon	boat
joog	stay, height

Figure: Task 1: expected culus VV series

Tasks 2 to 6

- 1 Task 2 is designed to test diphthongs.
- 2 Task 3 and 4 are intended to test VH in nouns with determiners (def article, possessive suffixes, associative (genitive))
- 3 Task 5 focuses on plural and other derivational suffixes.
- 4 Task 6 concerns larger phrases (either with interrogative particles, or waa/baa constructions)

The corpus

Target vowels were identified and text-gridded, after which F1 and F2 measurements were extracted via script at the vowel's midpoint. Outliers (notably high back vowels) were identified and values re-entered, where appropriate, by hand.

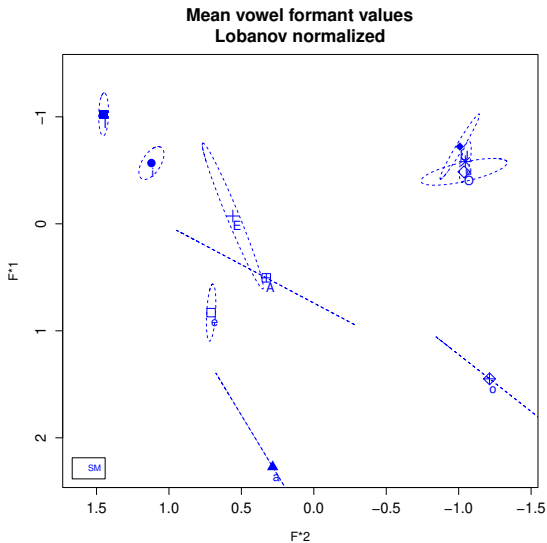
Outline

1. Vowel harmony in Somali
2. The speakers and the corpus
3. Description of our speakers' vowels
4. Discussion and further perspectives

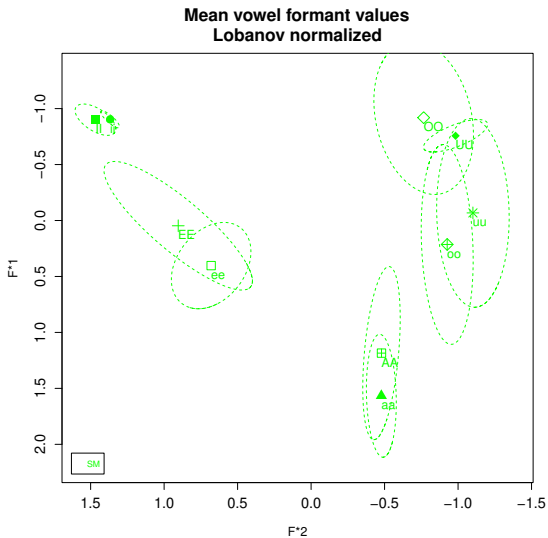
Task 1: vowel plots

- We focus on the acoustic analysis of vowels realized in task 1.
- For each speaker, we have established a plot of both short and long vowels.
- In each plot, ten vowels appear: [+ATR] vs [-ATR].
- Measurements currently represent 119 short vowels and 228 long vowels
- We used the Lobanov method to normalize F1 and F2 of each vowel.
- The plotting of vowel formant data (extracted with Praat), was done using NORM (<http://lingtools.uoregon.edu/norm/norm1.php>)

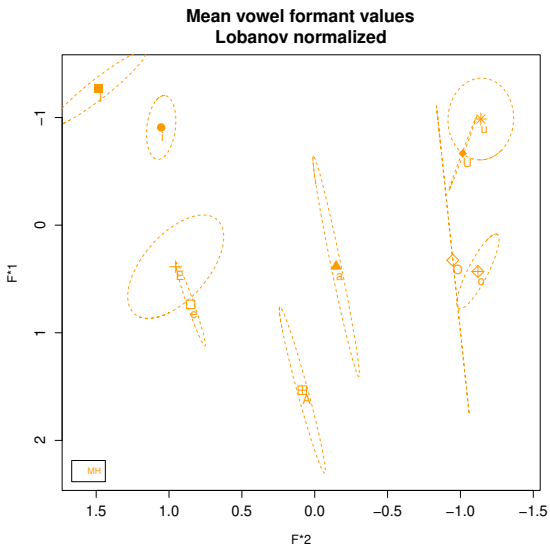
SM: short Vs



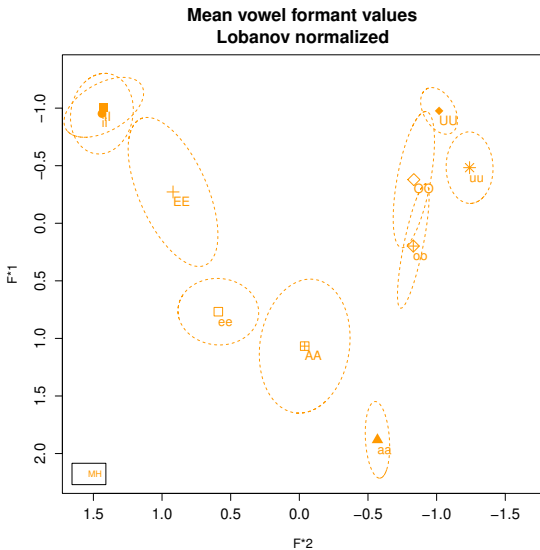
SM: long Vs



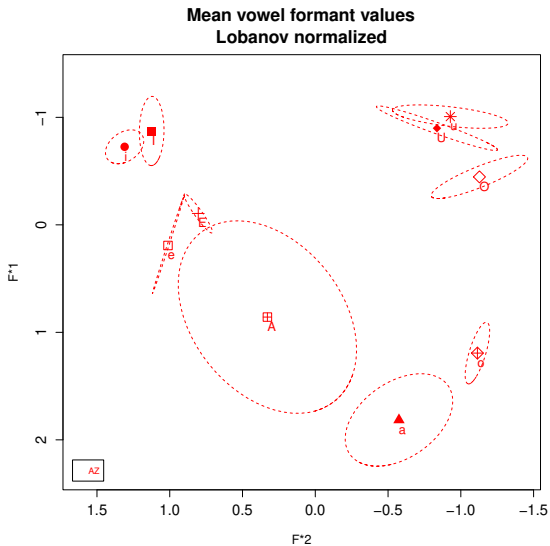
MH: short Vs



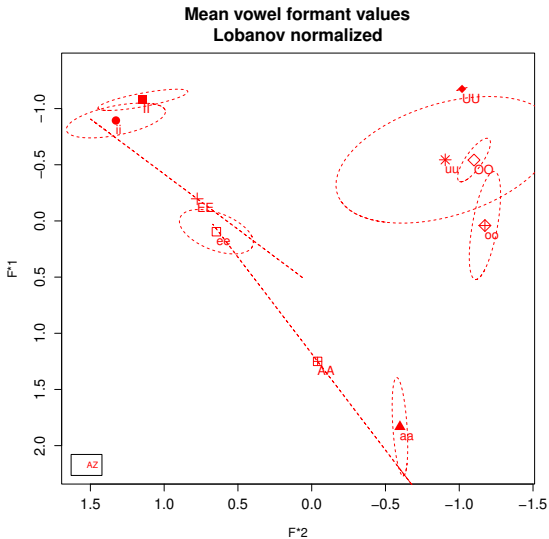
MH: long Vs



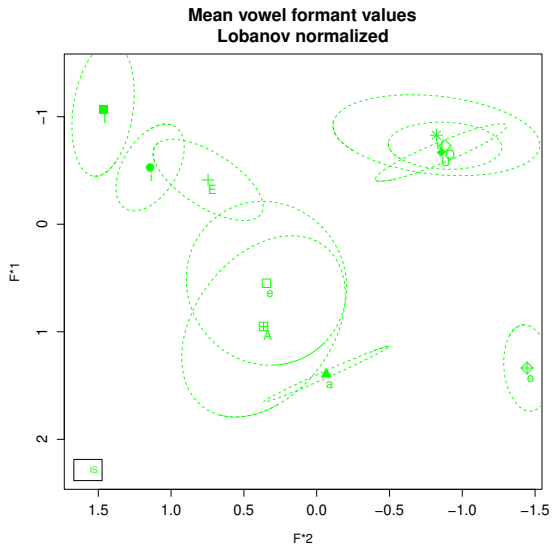
AZ: short Vs



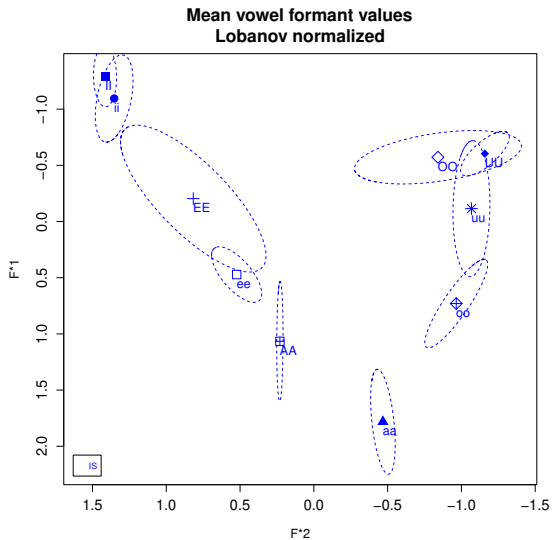
AZ: long Vs



IS: short Vs



IS: long Vs



Observations: short vs long Vs

- Neutral/culus distinctions are much clearer in short Vs than in long Vs (the opposite of what N&D 2019 found)

Observations: short vs long Vs

- Neutral/culus distinctions are much clearer in short Vs than in long Vs (the opposite of what N&D 2019 found)
- This may very well be a matter of these productions, or

Observations: short vs long Vs

- Neutral/culus distinctions are much clearer in short Vs than in long Vs (the opposite of what N&D 2019 found)
- This may very well be a matter of these productions, or
- be the result of the fact that the script is taking measurements at the midpoint. If there is some affect of tone on the vowel quality, the midpoint could perhaps be a transition point.

Observations: short vs long Vs

- Neutral/culus distinctions are much clearer in short Vs than in long Vs (the opposite of what N&D 2019 found)
- This may very well be a matter of these productions, or
- be the result of the fact that the script is taking measurements at the midpoint. If there is some affect of tone on the vowel quality, the midpoint could perhaps be a transition point.
- More data is perhaps necessary to come to a robust generalization.

Observations: individual realizations

MH and SM realizations seem more prototypical than the other speakers'.

(3) MH

- a. High front long vowels are collapsing, otherwise it's a clean long system
- b. Short low vowels are reversed, and also the back vowels may be collapsing overall.

(4) SM

- a. System similar to MH's.
- b. The back vowels have a high degree of overlap, at least for short vowels.
- c. Long vowel high front is collapsing. (see also AZ).

Observations: individual realizations

IS and AZ systems look more difficult to interpret.

(5) IS

- a. IS's long vowels are a good representation of raising/front for i/e/a but raising only for back vowels.
- b. Short high back vowels, in turn, seem to collapse.

(6) AZ

- a. The most difficult system to comment on.
- b. Inconsistency of his series contrasts.
- c. Culus vowels are centralized for his front short vowels.

Overall observations

- Overall, there are some overlaps in some instances in the vowel space for the speakers
- However, the averages are well differentiated.
- In a future experiment, tone pattern in long vowels could be controlled for.

Preliminary observations on tasks 4 and 5

(7) Task 4

- a. Three nouns: /baad/ 'extortion', /bææd/ 'wing', /bʁg/ 'belly'.
- b. We tested each of these nouns with the following suffixes:
 - (i) definite article
 - (ii) demonstrative (-kii, -kan, -kaas)
 - (iii) possessive (the whole pattern)
 - (iv) interrogative -kee.
- c. All speakers, except perhaps SM, produce the expected VH patterns.
- d. AZ, in particular, has the clearest system.

Preliminary observations on tasks 4 and 5

Tasks 4 Possessives:

(8) [-ATR] stem

- a. AZ: 2SG, 3SGF, 2PL, 3PL, INT have dominant [+ATR] harmony onto the stem
- b. IS: Entirely [-ATR], there is no dominant harmony, at least regressively
- c. MH: 3SGF, 2PL, 3PL, INT have dominant [+ATR] harmony onto the stem
- d. SM: Dominant harmony only from 2PL, though 3SGM sounds [+ATR] itself but does not trigger harmony.

See SOM where dominant harmony is from 1SG, 3SGM, 1PL, 2PL, 3PL; others are lax and do not harmonize regressively

Preliminary observations on tasks 4 and 5

- (9) [+ATR] stem
- AZ, IS, SM: [+ATR] extends to all items
 - MH: [+ATR] extends to all items on the second pass.
- (10) The /bɾŋg/ stem:
- AZ: Everything harmonizes [+ATR], including when he adds DEFs on the second pass through
 - IS: All seem [+ATR], except for 2SG+DEF (why is it so?)
 - MH: Most [+ATR], except 2SG and 1PL, which seem not to harmonize
 - SM: All seem to harmonize [+ATR]

Preliminary observations on tasks 4 and 5

- (11) Task 5
- a. 13 lexical items (nouns or verbs)
 - b. We tested each item in isolation, then the same item suffixed with one of the following:
 - (i) Plural (reduplicated, suffixal).
 - (ii) Denominals: -nimo, -iyad, -tooyo.
 - (iii) A compound: nasiibdarro.
 - (iv) Deverbals -itaan, -aal.
 - c. This dataset is exploratory: we aim at redoing this task with the same speakers with more items that might trigger regressive harmony.

Preliminary observations on tasks 4 and 5

Individual realizations of Task 5.

- AZ: Progressively, nothing out of the ordinary. Surprisingly, -tooyo doesn't harmonize regressively.
- IS: Progressively, everything looks as expected. -tooyo harmony occurs.
- MH: Progressively, as expected. For -tooyo, the suffix is tense, but doesn't harmonize the stem.
- SM: Progressively, as expected. No harmonization for -tooyo; the suffix itself even sounds lax

Outline

1. Vowel harmony in Somali
2. The speakers and the corpus
3. Description of our speakers' vowels
4. Discussion and further perspectives

To feed into the debate:

Some possible things to debate afterwards

- If we look only at the existence of minimal pairs, the [ATR] feature is weakly contrastive in the Somali VH system.

To feed into the debate:

Some possible things to debate afterwards

- If we look only at the existence of minimal pairs, the [ATR] feature is weakly contrastive in the Somali VH system.
- Yet, distribution of neutral vowels on the one side and distribution of culus ones on the other do overlap

To feed into the debate:

Some possible things to debate afterwards

- If we look only at the existence of minimal pairs, the [ATR] feature is weakly contrastive in the Somali VH system.
- Yet, distribution of neutral vowels on the one side and distribution of culus ones on the other do overlap
- Thus, phonological analysis should take into account the underlying specification of [ATR] values of each vowel.

Somali VH

- Somali VH may be classified as [+ATR] dominant as proposed by Aïm (1999) and Mohamoud (2013); see a survey of VH systems in Van der Hulst and Van der Weijer (1995), Rose and Walker (2011), and Rolle et al. (2020).
- In tongue root harmony systems, [+ATR] is generally dominant (Casali, 2008): this seems to be the case in Somali
- VH applies generally within words, which are generally defined based on VH...
- The question to be asked: is Somali a prototypical "complete ATR system"?

Somali VH

- According to Van der Hulst and Van der Weijer (1995, 514-517), [ATR] dominant systems display opacity of the low vowel /a/. This is not the case in Somali.
- Rolle et al. (2020, 135) mention Somali's VH once and define it as an outlier “fall(ing) outside of these three Complete ATR zones”.
- Rose and Walker (2011, 285), too, mention Somali's VH once: “Harmony domains that cross word boundaries are also reported for Nawuri (Casali 2002), Somali (Cushitic) (Hall et al. 1974), and Vata (Kru) (Kaye 1982).”
- Rose (2017) does not mention Somali but Somali's VH system possibly falls within the prototypical patterns she proposes.

There is much more work to do...

References I

- Andrzejewski, B. W. (1955). The Problem of Vowel Representation in the Isaaq Dialect of Somali. *Bulletin of the School of Oriental and African Studies* 17(1), 567–580.
- Angoujard, J.-P. and M. H. Hassan (1991). Qualité vocalique, rythme et genre grammatical en somali. *Linguistique Africaine* 6, 11–49.
- Armstrong, L. (1934). *The phonetic structure of Somali*. Hants, UK: Gregg Press.
- Aïm, E. (1999). Cas d'harmonie et de disharmonie vocalique en somali. Université Paris 7: MA Thesis.
- Casali, R. (2008). Atr harmony in african languages. *Language and Linguistics Compass* 2, 496–549.
- Green, C. R. (2021). *Somali Grammar*. New York, Berlin: De Gruyter Mouton.

References II

- Kimper, W., W. G. Bennett, C. R. Green, and K. Yu (2019). Acoustic correlates of harmony classes in somali. In E. Clem, P. Jenks, and H. Sande (Eds.), *Theory and description in African Linguistics: Selected papers from the 47th Annual Conference on African Linguistics*, pp. 199–212. Berlin: Language Science Press.
- Mohamoud, H. A. (2013). Atr harmony in somali – neutral vowels and dialectal variation. Leiden University: MA Thesis.
- Nilsson, M. and L. Downing (2019). Somali vowel qualities and vowel harmony domains. Paper presented at NACAL 47. Paris, 2019.
- Rolle, N., F. Lionnet, and M. Faytak (2020). Areal patterns in the vowel systems of the macro-sudan belt. *Linguistic Typology* 24, 113–179.
- Rose, S. (2017). Atr vowel harmony: new patterns and diagnostics. In G. Gallagher, M. Gouskova, and S. Heng Yin (Eds.), *Proceedings of the 2017 Annual Meeting on Phonology*.

References III

- Rose, S. and R. Walker (2011). Harmony systems. In J. Goldsmith, J. Riggle, and A. C. L. Yu (Eds.), *Handbook of Phonological Theory*, pp. 240–290. New York: Blackwell.
- Saeed, J. I. (1993). *Somali Reference Grammar*. Kesington, MD: Dunwoody Press.
- Van der Hulst, H. and J. Van der Weijer (1995). Vowel harmony. In J. Goldsmith (Ed.), *The Handbook of Phonological Theory*, pp. 495–534. New York: Blackwell.