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NOON VOWEL HARMONY

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Abstract

Noon vowel harmony shows the remarkable property of invariance in the affixes while exposing ATR variation in roots only. This study shows that the ATR harmony is no longer active and that the variation in stems due to dominant suffixes is best analysed as lexical stem variants for different derivational suffixes. This is shown to be the relics of an erstwhile fuller vowel harmony system.

Keywords: vowel, harmony, dominant, roots, affixes.

1. Introduction[1]

Noon, an Atlantic language from Senegal, displays an interesting system of Advanced Tongue Root (ATR) vowel harmony (VH). This study concentrates on the dialect of Noon which is called Cangin-Noon. The name Cangin has also been used for the language group including Noon, Laalaa (Lehar), Palor, Ndut, and Saafen (Saafi-Saafi). Wane (2017) proposed to use the label Saafi group for this higher level as this would be closer to the way speakers refer to the languages. The roots display VH whereas all affixes are invariant. However, a restricted number of the suffixes with a [+ATR] vowel operates ATR dominance over the root. This results in the remarkable situation that root faithfulness applies to affixes but not to roots. More general information on Noon can be found in Wane (2017), Soukka (2000), Lopis (2010 [1981] and Ndao 2014:39-47). Noon has three dialects: Cangin-Noon, Pade-Noon, and Saawi-Noon with subtle differences in their VH. After a presentation of the facts of the dialects of Noon regarding VH and a basic analysis, this study re-addresses the historical analysis of VH in the Cangin languages presented in Drolc (2004) in the light of the insights from Noon and a thesis on Laalaa (Lehar) (Dièye 2011).

2. Noon vowel harmony

Noon has a classic full ATR vowel inventory comprising five [-ATR] and five [+ATR] vowels. Each vowel in the system has its ATR counterpart. They are represented here with their IPA symbols as well as in the Noon orthography adapted in this article, table (1). Ndao (2014: 42) reports a lower first formant and a higher second formant for the [+ATR] vowels. A lower F1 value is what distinguishes the [-ATR] [ɪ ʊ] from the [+ATR] [i u]. This is in line with what is reported for ATR systems (Halle and Stevens 1969: 39; Maddieson 2003 on Kinande

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We use the abbreviations of Leipzig glossing rules: ANTIP = antipassive, APPL = applicative, ASSOC = associative, ATR = advanced tongue root, BEN = benefactive, CAUS = causative, CL = class, COMM = communal, CONN = connective, DEICT = deictic, DIM = diminutive, EXC = excessive, FUT = future, IMPER = imperative, INCL = inclusive, INF = infinitive, MAN = manner, MID = middle voice, N = nasal, NEG = negative, O = object, PAS = passive, PL = plural, POSS = possessive, PROX = proximal, PST = past, RECP = reciprocal, SEP = seperative, SING = singular, SOC = sociative, VOC = vocative.

Table 1: Cangin-Noon vowel inventory

[-ATR]:	ɪ	ɛ	a	ɔ	ʊ
orthogr:	i	e	a	o	u
[+ATR]:	i	e	ə	o	u
orthogr:	í	é	ë	ó	ú

2.1. Vowel harmony in roots

Noon nominal and verbal roots are in the vast majority monosyllabic. Disyllabic roots do exist and they show restrictions in vowel co-occurrence in line with ATR VH. Table 2 represents these restrictions, for both short and long vowels. The numbers refer to the total of similar cases in a word list of 240 items. The shaded cells are excluded by VH restrictions; X marks cells of combinations that do not occur but would adhere to ATR VH. There are many such additional gaps, probably because disyllabic nouns are rare in general.

Table 2: Table of vowel co-occurrences in disyllabic roots

V1→ V2↓	i	ɪ	e	ɛ	ə	A	o	ɔ	u	ʊ
i	3		2		1		1		1	
ɪ		X		3		X		X		1
e	1		1				X		X	
ɛ		X		3		4		X		2
ə	1	2	X	3	5	3	1	4	2	2
a		X		X		6		3		1
o	2		X		X		X		X	
ɔ		4		4		X		2		2
u	X		X		X		1		1	
ʊ		X		1		X		2		5

Table 2 also shows that there are virtually no restrictions to the vowel of the first syllable when the second syllable contains a [+ATR] **[ə]**; including disharmonic roots. The words **[kɛtək]** 'tree' and [**kɛləf]** 'butter' have respectively harmonious variants [**kɛtɛk]** and [**kɛlɛf]**. Similarly, [**a:sə]** 'enter!' has a harmonious variant [**a:sa:]**; while [**pənis]** 'horse' has a variant **[pənəs]**. The vowel [ə] seems to be a common and possibly reduced de-stressed option in the second syllable of disyllabic nouns –stress is on the first syllable–, and neutral to ATR harmony. In addition, there is a free variation in the imperative suffixes **[a]~[ə]** (Wane 2017:186). Note that the schwa [ə] is the [+ATR] counterpart of the low [-ATR] vowel [a**]** and operates as a full vowel, not in any way representing a reduced vowel as roots containing [a] change to **[ə]** when a dominant suffix follows, see (13-14) below. It occurs in the name from French [**ərik]**~[**erik]** 'Eric' which has a stressed vowel in the source; it can occur as a long vowel in [**kə:ni]** 'chili', a loan from Wolof, see (2). On the other hand, **[ə]** does occur in the second syllable of roots that have a [-ATR] vowel in the first syllable, such as [**lawəj]** 'wet', **[kɛtək]** 'tree' and **[nɪməʔ] '**number' which suggests that **[ə]** is a neutral vowel belonging to both vowel sets. The dominant causative suffix **[əʔ]** changes the first vowel **[a]** of **[lawəj]** 'wet' to **[ləwəj–əʔ]** 'make wet' which shows that the neutral vowel **[ə]** is transparent as predicted by Van der Hulst and Smith (1986) for neutral vowels containing the harmonic feature.

Table 3: Frequency of vowels in monosyllables (in a list of 175 monosyllabic words)

Ii	i	ɪɪ	ɪ	ee	e	ɛɛ	ɛ	əə	ə	aa	a	oo	o	ɔɔ	ɔ	uu	u	ʊʊ	ʊ
6	6	8	7	0	2	9	17	0	10	28	22	0	1	15	26	4	2	7	10

The low numbers for the [+ATR] long and short mid vowels suggest that they are secondary and exceptional. The wordlist contains monosyllabic and a few disyllabic roots.

(1)

[ɓewʔ]	'all'
[le:jʔ]	'upset'
[on]	'swallow'
[pe:ŋɪ]	'grass'
[pe:nɪ]	'monkey'
[te:me:]	'hundred'
[nɟɪ:ne]	'ghost'
[wɪ:no:]	'one'
[fokən]	'testicle'
[ko:nɪ]	'palm fruit'
[ndɪgom]	'riddle'

2.2 Vowel harmony in loans

Comparing both Wolof and French loans to their counterparts in Noon, we find systematic vowel correspondences. Noon uses the same vowels in loans from Wolof, as the source notes that Noon reduces the diphthong [iw] in Wolof to simple vowel [ʊ], (2). There are a few changes that French vowels undergo to match to Noon phonology. First, Noon does not have the mid front rounded vowel [œ] in French. The vowel [œ] surfaces in Noon as [ə], e.g., [kuləʔ] 'color'. Second, Noon has no consonant clusters. Thus, French loans containing clusters are adapted via epenthesis by insertion. The epenthetic vowel is identical to the following vowel, (2). There are instances where Noon uses the central [+ATR] vowel in the first syllable as a variant or as the preferred version in case of variation in the source. Since Noon speakers master Wolof, loans from Wolof need not always to be adapted to Noon phonology. Wolof has ATR VH just like Noon (Ka 1994:12-62).

(2) **Loans with VH**

Noon	**Gloss**	**Wolof**
[ɗu:li:n]	'oil'	**[diwlin]**
[puccu]	'top round on roof of house'	**[pucc]**
[ɗika:nta:]	'between'	**[digante]**
[timis]	'dusk'	**[timis]**
[wurus]	'gold'	**[wurus]**
[kə:ni]	'chili'	**[ka:ni]~[kə:ni]**
[ngele:m]	'camel'	**[gele:m]**

Noon	**Gloss**	**French**
[ərik]~[erik]	'Eric'	**[erik]**
[polin]~[pəlin]	'Pauline'	**[polin]**
[otoʔ]	'auto'	**[oto]**
[kuləʔ]	'colour'	**[kulœr]**
[dɔrɔk]	'drugs'	**[drɔg]**
[tapal]	'table'	**[tabl]**

2.3 Vowel harmony in compounds

Compounds are based on the combination of two open lexical classes such as nouns or verbs. They serve to create a new lexicon. In Noon compounds can be composed of only nouns or nouns + verbs and they are spelled with a hyphen (6). Compounds are different from phrases. The difference is recognizable on morphological criteria. Phrases consist of a head and an attributive noun as the second element. The head is always modified by a noun class marker attached to the genitive marker and the second element takes the definite noun class marker, (3).

(3) [**sɛl–fəŋ** **ɓʊr–ɪ:**]
bird–f:CONN king–ø:DEICT.PROX
'The king's bird'

Compounds take only one noun class maker. The noun class marker is determined by the head of the compound, (6). Compounds are characterized by the absence of a genitive marker.

(4) [**sɛl–fɪ:**]
bird–f: DEICT.PROX
'The bird'

(5) **[mu:ʔ–mɪ:]**
water–m:DEICT.PROX
'The water'

(6) **[sɛl-mu:ʔ–fɪ:]**
bird-water–f:DEICT.PROX
'The stork'

Compounds exhibit vowel harmony within their components but not across their components. Notice that vowels of both constituents can have the same ATR vowel feature or the constituents have different feature. In (7a-c) and (8a-d), vowels of both constituents in a compound have [-ATR]. In (7d-h) and (8f-g), the harmony is blocked, and therefore, it occurs only within the constituent in a compound. If the vowels of the first constituent in a compound are [-ATR], the vowels of the second constituent are [+ATR] in (7d-f) and (8e-g) and vice versa as shown in (7g-h).

(7) **ATR in noun-noun compounds**

a.	**[has-ʃa:l]**	/eye-man/	'diviner'
b.	**[kʊf-nɪrɔh]**	/toy-shepherd/	'insect'
c.	**ɟa:m-kɔh**	/grand.parent-god	'ladybird'
d.	**[kʊn-tu:jʔ]**	/hat-room/	'top of a room'
e.	**[mbɔ:s-tu:jʔ]**	/back-room/	'restroom'
f.	**[sɛl-mu:ʔ]**	/bird-water/	'stork'
g.	**[ɟu:nəʔ-ɛnɔh**	/soul-cow/	'butterfly'
h.	**[kiliŋ-na:l]**	/sex-bull/	'riding whip'

(8). **ATR in noun-verb compounds**

a.	**[ɲɪ:n-ka:n]**	/moon-die/	'end of month'
b.	**[lɔ:k-nʊp]**	/stomach-run/	'diarrhea'
c.	**[nɔh-sɔ:s]**	/sun-be.cold/	'night'
d.	**[kɛ:ɲ-tam**	/liver-be.hot/	'anger'
e.	**[kɔh-wis]**	/god-rise'	'daybreak'
f.	**[haf-misək]**	/head-have.pain/	'headache'
g.	**[lɔ:k-misək]**	/stomach-have.pain/	'stomach ache'

2.2. No affix alternation

Noon has several suffixes as the most common form of affix. However, there are very few prefixes, as shown in table (4). In fact, there is only a handful of derivational prefixes in the nominal domain: **[kə]** which is used for infinitives, diminutive nouns, and communal aspect[2], (9). The diminutive [**kə]** has a variant **[nɟə]** in the singular. The plural becomes **[tə]** due to the initial consonant alternation, (see Wane 2017: 59-60 for details). The prefixes containing a [+ATR] vowel **[ə]** do not induce VH in the roots because VH operates in a regressive direction in the roots, (9).

Inflectional and derivational affixes	**Wane (2017)**	**Lopis-Sylla (2010)**	**Soukka (2000)**
kə[3]	Infinitive, diminutive, communal	Infinitive	Infinitive
ɛ:n	Manner	Manner	(absent)
is	Separative	Reversive	Reversive
sɪ:s~ɪs, a:t	Iterative	Repetition (twice)	Intensive
ik	Excessive	Excessive	(absent)
lək[4]	Causative (indirect)	Causative	Factitive
əʔ[5]	Causative (direct)	Causative	Transitive
əʔ	Benefactive	Benefactive	Benefactive
ɔh	Applicative (locative, instrumental), reciprocal, antipassive, agentive	Reciprocal, instrumental, origin	Pluractional, locative, instrumental
ək[6]	Middle	Reflexive	Reflexive
nɛ:~na:s	Andative	Allative	Distal
əs, ʊ:	Plural/passive	Passive	Plural/passive
ndɔh[7]	Sociative causative	Simultaneous	Apportative

[2] Communal prefix kə–X denotes the geographical area of X, or the language of X, and with reduplication of X, the family of X.
[3] **kɪ** in Pade-Noon and Saawi-Noon
[4] **lʊk** in Pade-Noon and Saawi-Noon
[5] **iɗ** in Pade-Noon and Saawi-Noon
[6] **ʊk** in Pade-Noon and Saawi-Noon
[7] **dɔh** in Pade-Noon and Saawi-Noon

ɛː	Past	Past	Past
An	Future	Future	Future
rə[8]	Narrative	Narrative	Narrative
ən[9]	Perfective	Perfective	Perfective
rɪː, rɔː	Negative	Negative	Negative
ə[10]	Habitual	Habitual	Habitual
at~ət, aː~ə	Imperative	Imperative	Imperative

Table 4: Inflectional and derivational affixes in Noon

(9) **Prefixes with [+ATR] [ə]**

[kə–ʊnɔh–əs]	/INF–know–PASS/	'be known'
[kə–lɔm]	/INF–buy/	'to buy'
[kə–ɲaŋ]	/INF–learn/	'to learn'
[kə–ɔːmaːʔ]	/DIM–child/	'small child'
[tə–ɔːmaːʔ]	/DIM.PL–child/	'small children'
[kə–pɛʔ]	/DIM–goat/	'small goat'
[tə–pɛʔ]	/DIM.PL–goat/	'small goats'
[ɲə–ɔːmaːʔ]	/DIM–child/	'small child'
[ɲə–kɔt]	/DIM–foot/	'small foot'
[ɲə–pənis]	/DIM–horse /	'small horse'
[kə–waːl]	/COMM–Wolof/	'Wolof language'
[kə–nɔːn]	/COMM–Noon/	'Noon language'
[kə–faj~faj]	/COMM–Faye~ASSOC/	'The Faye family'

There is one derivational prefix with a [-ATR] vowel [**ɓʊ**] which denotes inhabitants or people, e.g. [**ɓʊ–cɛːs**] 'inhabitants of Thiès'. This prefix too is not affected by [+ATR] vowels in the roots, (10).

(10) **Prefix with [-ATR] [ʊ]**

[ɓʊ–poŋeːn] 'people of Pogneene'

In (11), the suffixes can contain [±ATR] vowels, but they do not change after [+ATR] roots.

(11) **Suffixes with [-ATR] vowels**

[iːs–aː]	/let.go–IMP.SG/	'let go'
[ndej–aː]	/go.on–IMP.SG/	'go on'
[ndej–at]	/do–IMP.PL/	'let's do'
[ɲjiːl–eː–n–ən]	/be.ill–PST–n–PRF/	'was sick'
[ngur–ʊː–n–ən]	/cut–PL–n–PRF/	'have cut'
[tum–ɛː]	/do–PST/	'did'
[tiːn–ɛːn]	/walk–MAN/	'manner of walking
[muː–mɪː]	/water–m:DEICT.PROX/	'the water'
[kɛtək–kɪː]	/tree–k:DEICT.PROX/	'the tree'
[tuːj–ɪː]	/room–ø:DEICT.PROX/	'the room'
[nɪmər–ɪː]	/number–ø:DEICT.PROX/	'the number'

[8] **ra** in Pade-Noon and Saawi-Noon
[9] **ɪn** in Pade-Noon and Saawi-Noon
[10] **ɪ** in Pade-Noon and Saawi-Noon

[ndək–ɪ:]	/village–ø:DEICT.PROX/	‘the village’
[hʊrmbəl–ɪ:]	/enclosure–ø:DEICT.PROX/	‘the enclosure’
[ngur–ɔh]	/cut–APPL/	‘cut for’
[hi:nd–ɔh]	/be.equal–RECP/	‘meet’
[ti:nd–ɔh]	/walk–APPL/	‘walk with’
[tik–ɔh]	/cook–APPL/	‘cook for’
[min–ɔ:]	/be.able–NEG/	‘cannot’
[tum–ɔ:]	/do–NEG /	‘do not’

Suffixes can contain [+ATR] vowels, they will change neither the root nor the other suffixes, (12). There are, however, two dominant suffixes [**əʔ]** (causative) and **[is]** (separative) that assimilate the [-ATR] vowel of the root to which they attach (more discussion in section 2.3).

(12) **Non-dominant suffixes with +ATR vowels**

[tum–əʔ–tɔ:]	/do–BEN–O1SG/	‘do (it) for me’
[yʊŋ–əʔ]	/sit–BEN/	‘sit for
[hɔt–ən]	/see–PRF /	‘have seen’
[a:w–ɔs]	/lead–PL/	‘(they) lead’
[sɛt–ən]	/be.clean–PRF/	‘be clean’
[ɲam–ik]	/eat–EXC/	‘eat without limitation’
[mbɛc–ik–ɔh]	/danse–EXC–RECP/	‘to dance a lot’
[wɔʔ–ik]	/speak–EXC/	‘chatter, chitchat’
[ɲam-lək]	/eat-CAUS/	‘make eat’
[kulli:]<kul–ri:>	/village–POSS.1PL.EXCL/ ‘our village’	
[kuləŋŋi:]<kul–əŋ–ri:>	/village–ø:CONN–POSS.1PL.EXCL/ ‘our village’	
[lamɪn–e:]	/Lamine–VOC/	‘Hey Lamine!’
[ya:y–e:]	/mother–VOC/	‘Hey mother!’
[ɔ:ma:ʔ–e:]	/child–VOC/	‘Hey child!’
[ʃa:l–e:]	/man–VOC/	‘Hey man!’
[ka:nndu:] <kaan–ru:>	/house–POSS.1PL.INCL/	‘our house’
[ka:n–fəŋ–gu:]	/house–f:CONN–POSS.1PL.INCL/	**‘**our house’

2.3. Dominant suffixes

As already mentioned in Drolc (2004), Noon and the other Cangin languages have several dominant suffixes. They are dominant because the [+ATR] vowel of the suffix spread onto the vowel of the root. In Noon, these are the separative [**is]** and the causative **[əʔ]** (allomorph **[əɗ],** (13-14). The two aforementioned suffixes are among the dominant suffixes reconstructed for proto Cangin in Drolc (2004:47).

(13) **The separative [is]**

[pɔk]	attach	**[pok–is]**	‘detach’
[laŋ]	close	**[ləng–is]**	‘open’
[kʊn]	cover	**[kun–is]**	‘uncover’
[cap]	button up	**[cəp–is]**	‘unbutton’
[la:ŋ]	cook	**[ləng–is]**	‘take from fire’
[wɪɲ]	dry clothes	**[wiɲ–is]**	‘remove clothes from line’

(14) **The causative [əʔ]**

[mɛjʔ]	leave	**[mej–əʔ]**	'send out'
[ɲam]	eat	**[ɲəm–əʔ]**	'nourish'
[jɔ:n]	learn	**[jo:n–əʔ]**	'teach'
[sɔ:s]	cold	**[so:s–əʔ]**	'be cold'
[lawəj]	wet	**[ləwəj–əʔ]**	'make wet'

3. The analysis of Noon vowel harmony

The harmony seems to be breaking down with the exceptions of disyllabic roots containing **[**ə] in the second syllable after a [-ATR] vowel in the first syllable, (15).

(15) **Noon disharmonic roots with [ə] in second syllable:**

[fɛkəʔ]	'raceme of a millet'
[sɛgəʔ]	'species of birds'
[kɛləf]~[kɛlɛf]	'butter'
[ɓɛtəwʔ]	'woman'
[fɛkəʔ]	'bell (flower)'
[la:wəj]	'be wet'
[ha:wəʔ]	'couscous'

Given the fact that **[ə]** occurs as a variant in the second syllable even when counter harmonic, we can conclude that the VH is no longer felt as operational to speakers.

The ATR alternations in roots only occur with the causative **[əʔ]** and separative **[is]** verbal derivations. Both derivations are not productive because they occur in a restricted number of verbs. The effect of the dominant suffixes is, in the vast majority of instances, one syllable to the left. However, we have a few examples of these dominant suffixes after disyllabic roots in which the root is affected, (16). Most [-ATR] disyllabic verbs do not take a separative or causative suffix. Attempts to combine verbs with the suffix **[əʔ]** resulted at best in the interpretation of the non-dominant homophonous benefactive suffix **[əʔ]** (17).

(16)

[lawəy]	'be humid'	**[ləwəj–əʔ]**	'make wet'
[nɟʊtʊt]	'be few'	**[nɟutut–əʔ]**	'lessen'
[ʊya:jʔ]	'be far'	**[uyə:j–əʔ]/uye:j–əʔ]**	'push further away'

(17) **Mary lɔm–əɗ–ən Amy ñɔ:**
Mary buy–BEN–PERFAmy shoes
'Mary has bought shoes for Amy.'

The dominant causative and separative suffixes occur closer to roots. They seem to be lexicalised units. They are often followed by other suffixes, derivational and inflectional which may be [±ATR], (18).

(18)

[**pok–is–ən]**	/attach–SEP–PRF/	'have detached'
[kən–əɗ–ɔh]	/carry.name–CAUS–ANTIP/	'greet'
[nɟəŋ–ər–ɔh]	/learn–CAUS–ANTIP/	'teach'
[ɓej–əɗ–ək–ən]	/bring–CAUS–MID–PRF/	'have carried'
[həw–əʔ–at]	/spend.nuit–CAUS–IMP.PL/	'good night!'
[pok–is–an]	/attach–SEP–FUT/	'will detach'

In principle, it is conceivable to have other derivational suffixes preceding the dominant one. However, there are no such examples. If we try to insert verbal derivational suffixes between the root and the dominant suffix we will get other constructions. For example, combining a causative with another derivation will require the indirect causative **[lək]** (see

Table 4) which is not dominant and more productive, (19). The set of verbs to which the dominant derivational suffixes causative **[əʔ]** and separative **[is]** apply, is closed and limited. And where these dominant verbal derivational suffixes are used, they immediately follow the root.

(19) [**tɪp–ɔh–cɪ:** **mbɛʒ–lək–ɔh**
battre–NMLZ–C:DEICT.PROX danser–CAUS–APPL
ɓɛtɪ–cɪ:]
femme–C:DEICT.PROX
'The drummers make the women dance.'

The fact that the causative suffix precedes the middle voice suffix in the combination **[əɗək]** after verbs like 'cry' to derive a verb with a human subject possibly suggests there is a morphological restriction that the causative **[əɗ]** should immediately follow the root. Because in these cases, there does not seem to be a semantic need that the middle has scope over the causative.

(20) **Derivation in [əɗək] <CAUS:MIDDLE>**

[kɔ:n]	cry (of cock)	**[ko:n–əɗək]**	'cry of a child'
[fɔ:l]	run	**[fo:l–əɗək]**	'skip'
[ɓɛj]	bring	**[ɓej–əɗək]**	'bring with oneself'

The number of roots affected by the ATR dominant suffixes is limited because these suffixes are no longer productive. ATR dominance in Noon does not operate as expected for a VH phenomenon because it only operates leftwards. Firstly, there are no dominant prefixes, but this can be accounted for the limited number of prefixes in the language. Moreover, dominant affixes tend to be suffixes in the languages of the world (Bakovic 200:237). Secondly, suffixes that follow dominant suffixes are not affected by them. This clearly shows that the direction of dominance is restricted to the direction of the left.

In sum, there is only a handful of verbs that show root alternations under the influence of dominant suffixes. One could alternatively consider the root vowel changes with dominant suffixes as morphological root alternations that are lexically stored rather than as phonological changes caused by dominance in vowel harmony. In such an alternative view, these verbs are lexical exceptions, and VH in Noon would be restricted to vowel co-occurrence restrictions in roots. Moreover, in such an analysis, in the absence of VH operating at word rather than root level, there is no operating dominance anymore (and hence no restriction to leftward direction either). Synchronically such an analysis is attractive in its simplicity although blind to alternations of root vowels. Moreover, it hides the fact that obviously, VH was more active in earlier stages of the language.

4. Noon vowel harmony in a historical perspective

ATR VH is no longer fully productive in Noon. The current behaviour of Noon VH can best be understood in a historical perspective. We position these traces of VH through a historical Cangin language perspective in this section; we attempt to reconstruct the Cangin developments in the VH behaviour of affixes.

4.1 The historical development of the dominant suffixes

The clearest remnant of VH in Noon is in the behaviour of two dominant suffixes. This behaviour is lexicalised since other suffixes containing the same vowels are not dominant. The two suffixes, separative [**is]** and causative [**əʔ]**, are dominant in all Cangin languages according to Drolc (2004:47). They contain the high [+ATR] front vowel **[i]** which is cross-linguistically often observed in dominant suffixes in ATR systems. The development of the causative to [**əʔ]** from [**iɗ]** is internal in Noon.

Most affixes in Noon are invariant whereas other Cangin languages do show ATR variation in affixes. Drolc (2004:52) argues that the non-alternating suffixes of Noon

correspond to [-ATR] suffixes in Ndut, Table 5. We expand this argument with Laalaa in which the corresponding suffixes are also [-ATR].

Table 5: Corresponding suffixes in Ndut, Noon and Laalaa

	Noon	**Ndut**	**Laalaa**
reciprocal	**ɔh**	**ɔx~əx**	**ɔh**
iterative	**(s)ɪːs**	**il~ɪl**	**ɪs**
passive	**ʊː**	**u~ʊ**	**ʊː**
benefactive	**əɗ**	**id~ɪd**	**ɛɗ**
habitual	**ə**	**aʔ~əʔ**	**ɛ**

Noon's closest relative Laalaa has a fully functioning VH system (Dièye 2011). Laalaa has a 10-vowel ATR system in long vowels in roots yet, a reduced system of short vowels.

Laalaa is similar to Noon in that the separative and causative verbal derivational suffixes are dominant (Dièye 2011:54) whereas in Noon, only the nearest syllable is affected. In Laalaa both syllables are affected if the root is disyllabic, for example [**mələkis]** 'predict'. Laalaa has an additional dominant suffix; the Past [+ATR] suffix **[i]** is invariant and dominant. Laalaa suffixes containing [-ATR] vowels are recessive and they undergo harmony which corresponds to the invariant suffixes of Noon. The (few) prefixes are [-ATR] recessive and equally undergo harmony, e.g. the infinitive prefix and other nominal prefixes (Dièye 2011:110ff).

Table 6: Corresponding suffixes in Noon and Laalaa

Gloss	**Noon**	**Laalaa**
Past	**ɛː**	**i**
Perfective	**ən**	**ɛn~nɛn**
Habitual	**ə**	**ɛ**
Future	**an**	**an**
Negation	**rɔː, rɪː**	**ri, ɔː**
Narrative	**ra**	**ra**
Imperative	**aa~ə, at~ət**	**aa, at**
Infinitive	**kə**	**ka**
Applicative	**ɔh**	**ɛɗ**
Antipassive	**ɔh**	**ɔh**
Middle	**ək**	**ɔk~uk**
Reciprocal	**ɔh**	**ɔh**
Iterative	**(s)ɪːs, aat**	**ɪs**
Passive	**ʊː, əs**	**ʊː~ ʊs**
Benefactive	**əʔ~əɗ**	**ɛɗ**
Causative	**əʔ~əɗ**	**iɗ**

Like Noon, in Laalaa the syllables following the dominant suffixes do not undergo harmony, (21). The [+ATR] second person plural pronoun [**ruː]** is dominant and changes the vowel of the preposition [**gaː]**, (22), but does not when used as an object suffix or possessive suffix, (23). The same applies to the [+ATR] first person plural exclusive pronoun [**rəfin]**, (24).[11] One could argue that the pronoun in the latter use follows a word boundary which is contradicted by the morphophonemic change of [**r]** to [**b]** in (23).

[11] Examples checked with El Hadji Dièye and his principal informant Roger Samba Faye on 3 January 2019 in Dakar.

In Laalaa, disharmonic morphologically complex words exist, in at least two ways: invariant [-ATR] suffixes following dominant suffixes and [+ATR] pronouns not showing dominance (except when used with the genitive preposition [**ga:**] (Dièye 2011:107-109).

We observe the same phenomenon in Pade-Noon. The 1PL pronouns [**ri:**] and the 2PL pronoun [**ru:**] do not affect the root when attached to a verb, (25). However, when they are suffixed to the prepositions [**na**] and [**ga**] they assimilate the vowel of the two prepositions which become [**nə**] and [**gə**], (26-27). This phenomenon does not happen in the Cangin-Noon because these prepositions already have the [+ATR] vowel [ə].

(21) [**lə:g–is–a**] **<la:g–is–a>**
put.on.fire–SEP–IMP.SG
'take from fire!'

(22) [**pənis–fa: gə:–ru:**]
horse–CL4:this of–O2PL
'Your (pl) horse.' (Dièye 2011:137, ex. 249)

(23) [**mɛ ɲam–bu:**] **< mɛ ɲam–ru:>**
1SG eat–O2PL
'I eat you' (Dièye 2011:149, ex. 298, from a story)

(24) [**kʊ–rəfin**]
son–1PL.EXCL
'our son'

(25) **am–dɔh–a:ri:**
attraper–CAUS.SOC–IMPER–1PL.EXCL
'Help us!' (Soukka 2000:58)

(26) **[gə–ri:] <ga–ri:>**
PREP–O.1PL.EXCL
'to us' (Soukka 2000:59)

(27) **[nə–ru:] <na–ru:>**
PREP–O.2PL
'with you' (Soukka 2000:59)

We can conclude that the common predecessors of Laalaa and Noon had a richer VH system. A system in which dominant suffixes were productive and another in which there are anomalies such as the strict regressive nature of dominant suffixes. Noon inherited the latter but the dominant suffixes lost their productivity and the regressive causative suffix **[lək]** took over the functionality of the dominant causative suffix **[əʔ]**.

4.2 The historical development of other affixes

Noon and Laalaa also deviate the behaviour of the other affixes. They are invariant and blind to the VH in Noon. In Laalaa, they are alternating recessive affixes. Assuming that Noon lost the alternation in these weak affixes, the following question should be asked. Which variants of the alternating pairs do remain as invariant? The Noon kept the [-ATR] variant for the reciprocal **[ɔh]** = Laalaa (L) **[ɔh]**, the passive **[ʊ:]** = L. [**ʊ:**], the imperatives [**a**] and [**at**] = L. **[a]** and [**at**], the conditional **[a:]** = L. hypothetical **[a:]**, see correspondent affixes in table 6. The Noon vowel of the iterative **[is]** is higher than the Laalaa equivalent **[ɛs].** Laalaa has a rule of height assimilation of mid vowels to high vowels after high vowels in verbal suffixes. Hence the roots with high vowels in Laalaa do have the [is] variant for the iterative. It is possible that this rule of vowel assimilation led to a reinterpretation of the suffix **[is]** as the suffix **[ɛs]** elsewhere.

For some other affixes with a low vowel, Noon kept the [+ATR] variant [**ə**]; this is the case for the infinitive [**kə**] = L. **[ka]** and the narrative **[rə]** = L. **[ra]**. In fact, **[ə]** occurs more commonly in Noon affixes. It occurs also where Laalaa has [**ɛ e**] as in the perfect **[ən]** = L. **[ɛn]**, habitual **[ə]** = L. **[ɛ]**, benefactive **[əʔ]~[əɗ)** = L. applicative **[ɛɗ], see** Table 6 above. There seems to be a general development to [**ə]** in Noon especially in final syllables. This is probably linked to a tendency in Noon for vowels in the second (unstressed) syllable to become [**ə]** see above 1.1.[12]

The intriguing invariant [+ATR] past suffix of Laalaa **[i]** corresponds to the Noon invariant [-ATR] suffix [**ɛ:]**. In several occurrences, the past suffix in Dièye's thesis is followed by the habitual [**ɛ]** rendering [**ɛ:]** (Dièye 2011:72). What we want to stress here is that Laalaa too has the phenomenon of invariant [+ATR] suffixes which is so common in Noon[13].

This fact raises doubts about the suggestion by Drolc (2004:53) who argues that in general in Cangin languages the alternation in the [-ATR] affixes is an innovation. In the developments between Noon and Laalaa, the more likely scenario is that Noon lost the alternation otherwise it cannot be easily explained how Laalaa developed a [-ATR] variant from a common affix with a [+ATR] vowel. These could not be simply explained by the introduction of VH but one would need additional reinterpretation and generalisation of patterns.

Drolc (2004) argues that the progressive harmony (or stem control harmony) is a contact-induced feature from Wolof, whereas the regressive harmony by [+ATR] dominance is original Cangin languages. There are some problems with that argument. One is that regressive harmony versus progressive harmony is usually seen as a correlate to prefixing/suffixing typology Hansson (2001:180). Laalaa dominant suffixes occasionally do affect the following syllables, (28). According to Dièye (2011:194), the perfective can be realized either as **[ɛn]** with [-ATR] root or [in] with [+ATR] root. Vowel co-occurrence restrictions cannot be due to contact. If proto Cangin had some form of VH then most likely it also had alternating affixes. If dominant affixes can be reconstructed then most likely once a full VH system existed. That in itself (or the full extent of it) could have been an innovation to explain the apparent secondary nature of [+ATR] mid vowels in Laalaa, Noon and Cangin languages in general (Drolc 2001:41).

(28) [Roger **jo:d–ir–in** **kɛwa:l] <jɔ:d–ir–ɛn** **kɛwa:l >**
Roger learn–CAUS–PFT COMM-wolof
'Roger has taught wolof.' (Dièye 2011:209 ex. 521)

5. Conclusion

The situation in Noon VH with alternating stems and invariant affixes is hence faithful to the affixes but not to the roots in which it is only apparent. The VH facts are relics of an earlier system that is still fully operational in Noon's closest neighbour Laalaa. The stem alternations are analysed as a limited number and lexically coded variants of unproductive causative and separative derivations. The restrictions in vowel co-occurrences are not operational. They occur in roots only and not at the word level and they do not lead to adaptations of loans.

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[12] The Noon indirect causative [**lək]** has [**ə]** where Laalaa has [**ɔ]** in L. [**ɛlɔk]**. Drolc (2004) notes such an [**ə** & **ɔ]** alternation in Ndut. It is not clear whether this correspondence has the same motivation or whether the correspondence is a sign of a general emergence of [**ə]** in suffixes in Noon.

[13] In addition to the past suffix there are two object/possessive clitics that contain [+ATR] vowels but are invariant: [**ru:]** O.1PL.INCL and [**rafin]** O.1PL.EXCL.

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