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Vowel Harmony in Úwù

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ABSTRACT

Úwù is one of the many endangered languages in Nigeria {(Abiodun (2004, 2007); Choon (2012))}. The language is spoken by an estimated population of about 3000 people in a small community known as Àyèré in Ìjùmú Local Government Area (LGA) of Kogi State, Crozier and Blench (1992). There is an ongoing controversy over the status of the language as to whether it is a dialect of Yorùbá or a distinct language. This is due to the lexical and structural similarities between the two linguistic codes. This paper describes the vowel harmony system of Úwù with a view to showing its level of relatedness to Yoruba, and by implication documents this aspect of the language for posterity. Harmonic constraint in Úwù is based on tongue root positions where ATR mid-vowels do not interact with RTR mid-vowels in a phonological word. Harmonic principle in Úwù is most reflected in words of VCV and CVCV structures. The analysis of selected data is premised on the Autosegmental Theory of Phonology {see (Hulst and Smith 1985); (Goldsmith 1990)}. The study reveals that Úwù operates a seven vowel system that manifests a partial harmony system, comprising of seven oral and five nasal vowels. Apart from this, the language operates a root-controlled assimilation process, and the direction of harmonic spread in Úwù is leftward, since affixes in Úwù are mainly prefixes. Although, there are few instances that suggest that neutral vowels are both opaque and transparent in Úwù, the paper concludes that neutral vowels are actually opaque in the language.

Keywords: Vowel harmony, Partial harmony, Tongue root harmony, Autosegmental phonology, Úwù

1. INTRODUCTION

Scholars including Crozier and Blench (1992), Abiodun (2004, 2007), Choon (2012), Adeoye (2015) and Allison (2015) have all claimed that Úwù is an endangered language. Crozier and Blench (ibid) report that Úwù has a population of 3,000 speakers. Apart from this, the younger generations of Úwù speakers do not use the language as often as the older generation (Abiodun 2007, Allison 20015). In fact, Yorùbá is the lingua franca in Ayere and it competes favourably with Úwù in official, un-official and semi-official domains. The implication of this is that there is a shift to Yorùbá language to the detriment of Úwù. This continuous shift has caused the native speakers of Úwù (especially the youths) to begin to forget some vocabularies of their language. Apart from the above, in-depth scholarly works on the language are not very many. Because of this, much is not known about the structure and grammar of the language.

Earlier scholars in the field of phonology have written on the vowel harmony system of various languages. For instance, Abiodun (1991, 2002), Duttweiler (2001), Archangeli and Pulleyblank (2002), Moller (2009), Ritchart and Rose (2015), and Akinlabi (2009) describe how the phenomenon manifests in Igede, Ukaan, C'lela, Kinande, Moro and Lokaa languages respectively. Apart from showing how vowel harmony operates in these various languages, the works of the scholars serve as documentation of the phenomenon in the languages. Hence, this paper intends to describe and by implication document the vowel harmony system of Úwù (Jelili, 2018).

This paper is divided into four sections, section one is the introduction, section two presents the theoretical framework, and section three discusses the vowel harmony system in Úwù. The paper concludes in section four.

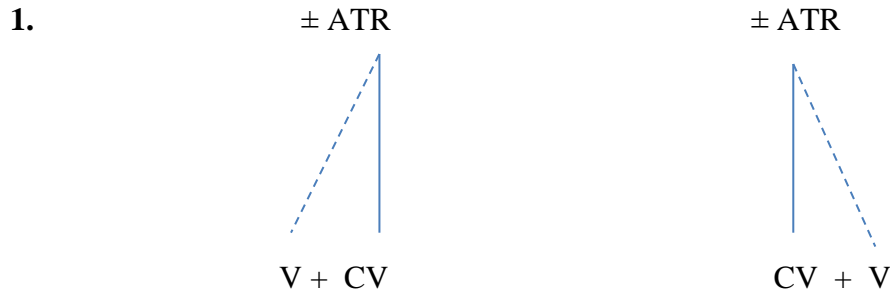
2. THEORETICAL FRAMEWORK

The theoretical framework employed for analysis of the data presented in this paper is the Autosegmental Phonology. The choice of this theory is made due to its adequacy in analyzing previous works by earlier scholars on the vowel harmony system of several languages. Some of these works are: Chumbow (1982), Abiodun (1991), Duttweiler (2001), and Omar (1993). The theory has also been reported to be very efficient in analyzing phonological issues like tone, nasality and vowel harmony (see Hulst and Smith (1985), Goldsmith 1990). Autosegmental phonology is a revision of the basic assumption in Generative phonology that phonological representation is a linear sequence of segments that are composed of distinctive features. This assumption suggests that utterances can be sliced into vertical columns with appropriate feature specification assigned to each column. Unlike the linear phonology, the central theme of autosegmental theory is that phonological representation must allow for different levels that are independent of each other. Such independent levels, it is argued, reflect more adequately the activities of the various channels of articulation. Hence, autosegmental theory seeks to make formal description much more adequate than the linear model of Generative Phonology.

Since autosegmental theory allows for independent levels, one of the basic issues addressed by the theory is the synchronization of levels. In other words, prosodic and segmental features are situated on separate levels but they are co-articulated through the use

of association lines. These association lines that link the autonomous tiers are determined by some universal conventions called Well-Formedness Conditions (WFC). The WFC is spelt out in Durand (1990).

The WFC may be illustrated using the [+/- ATR] features of vowels as shown below:



Association or linking of levels may go from right-to-left or left-to-right in the derivation of correct output because data from natural languages have shown the operation of this mechanism. Spreading or assimilation in vowel harmony is either asymmetric (affix-controlled) or symmetric (root-controlled) (Casali 2008: 513). 1 above illustrates the latter case. In a language that manifests asymmetric assimilation system, prefixes normally trigger a left-to-right spread, while suffixes normally trigger a right-to-left spread. Previous studies (e.g. Moller 2009) have also shown that in a language where prefixes and suffixes harmonize with roots, the association is always bi-directional. In the subsequent sections, we will show how far the autosegmental theory can analyze the vowel harmony system of Úwù language.

3. OWEL HARMONY IN ÚWÙ

In a language that operates a vowel harmony system, vowels fall into two or more harmonic sets based on shared phonetic properties. Vowel harmony is a very familiar feature in many African languages. Languages that attest this feature impose the euphonic constraint of allowing vowels from a particular set to co-occur together in a well-defined domain to the exclusion of members of other sets (Oyebade, 1998). Abiodun (2007: 62) defines vowel harmony as “a phenomenon in which a span of vowels within a derived or underived word exhibits a single value for some phonological (vowel) features, which may relate to height, roundness, or retracted tongue root”. For instance, vowels harmonize on the basis of tongue root position in Klao (Singler 1983), Igede (Abiodun 1991), Ukaan (Abiodun 2000), Lokaa (Akinlabi 2006), Bale (Moller 2009), and Wolof (Ka 1993, Pulleyblank 1996, Unseth 2009). Van der Hulst (2012) reports that vowel harmony is based on tongue height and roundness features in both Turkish and Hungarian while Dettweiler (2001) and Ritchart and Rose (2015) report that vowel harmony is based on tongue height in c’Lela and Moro languages respectively. Two categories of vowel harmony systems have been recognized in the literature. They are: full or complete and partial or incomplete systems. In a language that operates full vowel harmony system, vowels fall into two or more harmonic sets without any overlap. For instance, Igede (Abiodun 1991), Igbo (Iloene 2007), Bale (Moller 2009), and Cicipu (McGill 2011) are examples of languages that operate a full vowel harmony system.

On the other hand, in a language that operates a partial vowel harmony system, vowels fall into two or more harmonic sets with overlaps. For instance, Yorùbá (Awobuluyi 1967, Archangeli and Pulleyblank 1989, Oyebade 1998, Abiodun 2007, Oladeji 2014), Ukaan (Abiodun 2000), Lokaa (Akinlabi 2009) and c’Lela (Dettweiler 2001) have all been shown to operate a partial harmony system.

Úwù is another example of a language that operates a partial vowel harmony system with harmony constraint based on tongue root position. The language has seven oral vowels and five nasalized ones. They are presented in Figs. (2) and (3) below:

2. Oral Vowels

	Front	Central	Back	
ATR	i e		u o	high
RTR	ɛ	a	ɔ	mid low

3. Nasal Vowels

	Front	Central	Back	
ATR	ĩ		ũ	high
RTR	ẽ	ã	õ	mid low

The Figs. above show seven oral vowels in (2) and five nasal vowels in (3). Note that the oral and nasal vowels may occur in complementary distribution as the oral vowels often become nasalized when they occur after nasal consonants (Allison 2015: 39). Fig. (4) below shows how the vowels are grouped according to their harmonization principles.

4.



In (4) above, we show that vowels [i, ɪ, ʊ, u, a, ɔ̃] are found in both set I and set II, hence they are referred to as neutral vowels. Data 5 below shows how the vowels overlap between the two sets in VCV and CVCV words.

5.	emi	‘I’	ũta	‘thigh’
	údí	‘hill’	enã	‘meat’
	odzi	‘thief’	ehã	‘palm cancell shaft’
	ófú	‘witch/wizard’	égà	‘future tense morpheme’
	ita	‘three’	irɔ	‘eight’
	ahi	‘belly’	ugɔ	‘navel’
	lólá	‘dream’	wúré	‘ask’
	kúfo	‘gather’	pedu	‘pass by’
	fujé	‘be light’	jídò	‘stand’

Vowels [i, u, a] have been treated as neutral vowels in Yoruba (Awobuluyi 1967, Archangeli and Pulleyblank 1989, Oyebade 1998, Abiodun 2007, Oladeji 2014), C’lela (Duttweiler 2001), and in both Turkish and Hungarian languages (Van der Hulst 2002). In Lokaa (Akinlabi 2006) also reports that [ɪ ə a u] are neutral vowels, while Moller (2009) reports that [a] is the only neutral vowel in Bale. It implies that to consider [i, ɪ, ʊ, u, a, ɔ̃] as neutral vowels in Úwù would not be a strange phenomenon.

Apart from the above, vowels [e o] and [ɛɔ] as shown in (6) below do not harmonize in Úwù. This is because vowels [e o] have [+ATR] features while [ɛɔ] have [-ATR] features.

6.	[+ATR]	[-ATR]		
	efo	‘hut’	emẽ	‘you’
	egbe	‘bone’	ẽtɔ	‘new’
	ehè	‘leg’	èdɔ̀	‘chest’
	elè	‘beans’	ɔwɔ	‘hand’
	olo	‘grinding stone’	òdò	‘soup’
	ogò	‘river’	emɔ	‘palm wine’
	èdè	‘language’	èfè	‘yam’
	òjò	‘hole’	éle	‘money’
	eɟ ^w e	‘blood’	ɔpẽ	‘crocodile’
	ekpò	‘stick’	enẽ	‘evening’
	éwó	‘goat’	ɔde	‘hunter’
	owe	‘proverb’	èmè	‘you(pl)’

The following facts are evident from the data above;

Vowels [e, o] as V₁ do not co-occur with vowels [ε, ɔ, ẽ, õ] as V₂

Vowels [ε, ɔ, ẽ, õ] as V₁ do not co-occur with [e, o] as V₂

Vowels [i, u, a, ĩ, ũ, ã] co-occur with other vowels

In a V₁CV₂ Structure, nasal vowels can occupy V₁ position.

v. All nasalized vowels (i.e. ĩ, ũ, ẽ, ã) can occupy the V₁ and V₂ positions in words of VCV Structure of in Úwù language. Consider the data below:

7.	nasal vowel as V ₁		nasal vowel as CV ₂	
	ãfã	‘clay’	enã	‘meat’
	ẽɔ	‘new’	ẽɲẽ	‘sand’
	ôdô	‘soup’	ɔkô	‘heart’
	ũta	‘thigh’	orũ	‘sleep’
	ĩka	‘termite’	oɲĩ	‘water’
	ũdu	‘penis’	unũ	‘tongue’
	ãfi	‘sheep’	anũ	‘mouth’
	ôtɛ	‘alcoholic drink’	inĩ	‘root’
	eɲĩ	‘tooth’		

Vowels [i, ĩ, u, ũ, a, ã] are the only vowels that can occupy the V₁ position when any vowel irrespective of its ATR feature is V₂.

Table 8 below presents a summary of the harmonization principle in Úwù:

8.

V2												
V1	i	ĩ	e	ε	ẽ	a	ã	u	ũ	o	ɔ	õ
i	√	√	√	√	√	√	√	√	√	√	√	√
ĩ	√	√	√	√	√	√	√	√	√	√	√	√
e	√	√	√	*	*	√	√*	√	√	√	*	*
ε	√	√	*	√	√	√	√	√	√	*	√	√
ẽ	√	√	*	√	√	√	√	√	√	*	√	√
a	√	√	√	√	√	√	√	√	√	√	√	√
ã	√	√	*	√	√	√	√	√	√	*	√	√
u	√	√	√	√	√	√	√	√	√	√	√	√
ũ	√	√	√	√	√	√	√	√	√	√	√	√
o	√	√	√	*	*	√	√	√	√	√	*	*
ɔ	√	√	*	√	√	√	√	√	√	*	√	√
õ	√	√	*	√	√	√	√	√	√	*	√	√

Note: √ = acceptable sequence

* = unacceptable sequence

√* = Less productive sequence

The sequence eCã is less productive in the language as éhã is the only example found in the data collected for this work. Apart from this, sequences: ãCe and ãCo in addition to the mid-vowels unacceptable sequences do not exist in Úwù.

Just like the case of the VCV words, [+ATR] and [-ATR] mid vowels do not also harmonize in words of CVCV as shown in

9.	bèrè	‘ask question’	berɛ	‘begin’
	wewe	‘leaf’	gòlò	‘sweep’
	lójó	‘surpass’	lòlɛ	‘swim’
	jéjò	‘greet’	wówó	‘bush’

One would observe that most of the examples presented above to show harmony constraint are words of VCV structures. This is because the vowel harmony system within words is most reflected in VCV structures in the language. Other structures (e.g. VCVCV) on the other hand do not in most cases show the harmony constraint. Consider the examples below:

10.	amúga	‘scissors’
	àtekú	‘knee’
	uwáfɛ	‘food’
	ìfɛkpe	‘cane’
	èkíta	‘stone’
	anùwá	‘door (way)’

The reason for this difference between VCV words and structures beyond VCV as observed in Úwù is probably due to the fact that the VCV words are the simplest forms of nouns (having two vowels and a single consonant) in the language. Whereas some of them are underived, others are derived by adding a vowel- prefix to a verb-stem (e.g. V + CV). We observe that such prefix normally preserve the harmonic feature of the CV-stem to which it is attached. More so, [+ATR] mid vowels (e/o) and [-ATR] mid vowels (ɛ/ɔ) which in most cases preserve the harmony constraint of the language do not normally occur together in a single word as shown in (6) above. The data also shows that only neutral vowels co-occur freely with any mid vowel irrespective of its ATR feature in both VCV and structures beyond VCV (see 5 and 9 above).

3. 1. Affix harmony

Affix harmony reflects on derived words. It is a situation where affixes harmonize with the roots to which they are attached. In Úwù, vowel harmony is not robust; this is evident in the pattern of affixation in the language. Affixes (i.e. Prefixes) in Úwù reflect harmonic

constraint mostly in the nominalization of monosyllabic verbs. However, such a prefix in most cases is usually a mid-vowel. In other words, a mid-vowel as a prefix can only attach to a CV-root that contains a vowel of the same ATR feature. Consider the examples below:

- 11.**
- | | | | | | |
|---|---|-------------------|---|------|---------------|
| e | + | fo | → | efo | ‘hotness’ |
| | | ‘hot’ | | | |
| o | + | dʒi | → | odʒi | ‘theif’ |
| | | ‘steal’ | | | |
| o | + | lò | → | olò | ‘grinder’ |
| | | ‘grind’ | | | |
| ẽ | + | dʒɛ | → | ẽdʒɛ | ‘fruit’ |
| | | ‘bear (of fruit)’ | | | |
| ɔ | + | lɛ | → | ɔlɛ | ‘lazy person’ |
| | | ‘weak’ | | | |
| ó | + | lá | → | ólá | ‘dream (N)’ |
| | | ‘dream (V)’ | | | |
| ɛ | + | gbɛ | → | ɛgbɛ | ‘dryness’ |
| | | ‘dry’ | | | |

On the other hand, a neutral vowel (i,u, a) can attach as a prefix to any CV-root irrespective of the harmonic feature of the vowel of such root. Consider the examples below:

- 12.**
- | | | | | | |
|---|---|-------------|---|------|--------------|
| u | + | lò | → | ulò | ‘drum’ |
| | | ‘beat drum’ | | | |
| i | + | to | → | ito | ‘urine’ |
| | | ‘spit’ | | | |
| i | + | dʒú | → | idʒú | ‘dance (N)’ |
| | | ‘dance (V)’ | | | |
| i | + | gbɛ | → | igbɛ | ‘insult (N)’ |
| | | ‘abuse’ | | | |
| i | + | mǎ | → | imǎ | ‘knowledge’ |
| | | ‘know’ | | | |

In addition to the above, gerunds do not also reflect any form of harmony constraint. The gerundive prefix of the language is “a”, and it can be attached to any CV-verb-stem irrespective of the ATR feature of the vowel of such verb to form a gerund. Consider the examples below:

- 13.**
- | | | | | | | |
|------|---|---|-----|---|------|------------------|
| i. | a | + | fò | → | afò | ‘washing’ |
| ii. | a | + | ʃe | → | aʃe | ‘eating/ edible’ |
| iii. | a | + | mɔ | → | amɔ | ‘molding’ |
| iv. | a | + | gbɛ | → | agbɛ | ‘planting’ |

Furthermore, vowel [a] can also nominalize a verb phrase irrespective of the ATR features of the vowels of the verb-phrase-stem to which the vowel is attached as shown in the examples below:

14. a.	i.	jì	#	adʒò	→	ʃadʒò	→	aʃadʒò	‘worker’
		do		work					
	ii.	kpu	#	olowù	→	kpolowù	→	akpolowù	‘killer’
		kill		somebody					
14. b.	i.	kú	#	alè	→	k ^w álè	→	ak ^w álè	‘parker’
		pack		floor/refuse					
	ii.	gbala	#	alè	→	gbalalè	→	agbalalè	‘sweeper’
		sweep		floor					
	iv.	fo	#	àki	→	fàki	→	afàki	‘wash cloth’
		wash		cloth					
	v.	mɔ	#	ùʃà	→	mùʃà	→	amùʃà	‘potter’
		mold		pot					

Although, vowel[a] is a neutral vowel, note that the vowel is [-ATR], yet it can attach to any stem irrespective of the ATR feature of its vowels. For instance, all the vowels of the verb phrase stem in (14a) above are either [+ATR] (kpolowù) or [-ATR] (ʃadʒò), and those of (14b) are both mixed with [+ATR] and [-ATR] vowels (mùʃà), yet the prefixial vowel is constant.

Another aspect that shows that affix harmony is not robust in Úwù is the pattern for deriving genitive nouns in the language. Abiodun, Adeoye and Allison (2014) report that the genitive marker in Úwù language is [óní], they presented the data repeated below:

15.	óní	+	ùbó	ólúbó	‘owner of gun’
	óní	+	alè	ólálè	‘owner of land’
	óní	+	elè	ólélé	‘owner of beans’
	óní	+	enã	ólénã	‘owner of meat’
	óní	+	éṅmgbá	óléṅmgbá	‘wise person’
	óní	+	òwà	ólówà	‘owner of farm’

From the data above, we see that the form of the initial vowel [o] of the genitive marker never changes irrespective of the ATR features of the stem to which the genitive marker is attached. This shows that the vowel [o] of the genitive morpheme is never influenced by the harmonic features of the vowels of the stem to which the genitive morpheme is attached. In contrast to what obtains in Úwù as regards the pattern of genitive construction, Abiodun(2005) and Chumbow (1952) report the robustness of vowel harmony in Igede and Ebiralanguages respectively by showing that genitive marker in the two languages has two forms; Igede: ‘oli’ / ọlì’, Ebira: ‘onĩ/ ọnĩ. The two forms are usually determined by the ATR feature of the root to which the genitive morpheme is attached. Consider the examples below (cf Abiodun, 2005);

16. Igede language

- (a) oli + idzu → olidzu ‘owner of yam’
 oli + ùbè → olùbè ‘owner of room’

- (b) ọlì + ụte → ọlute ‘owner of root’
 ọlì + ọba → ọlọba ‘owner of mat’

16. Ebira language

- (a) onĩ + íresi → oníresi ‘owner of a dog’
 onĩ + ozi → onozí ‘owner of child’
- (b) ọnĩ + ùrá → ọnǔrá ‘owner of pig’
 ọnĩ + úvènè → ọnǔvènè ‘owner of mat’

As may be observed from the pieces of data presented above from both Igede and Ebira languages, the choice of the genitive marker depends on the harmonic feature of the root. For instance, in Igede language, oli is attached to a root that consist of [+ATR] vowels, while ọlì is attached to a root that consist of [-ATR] vowels.

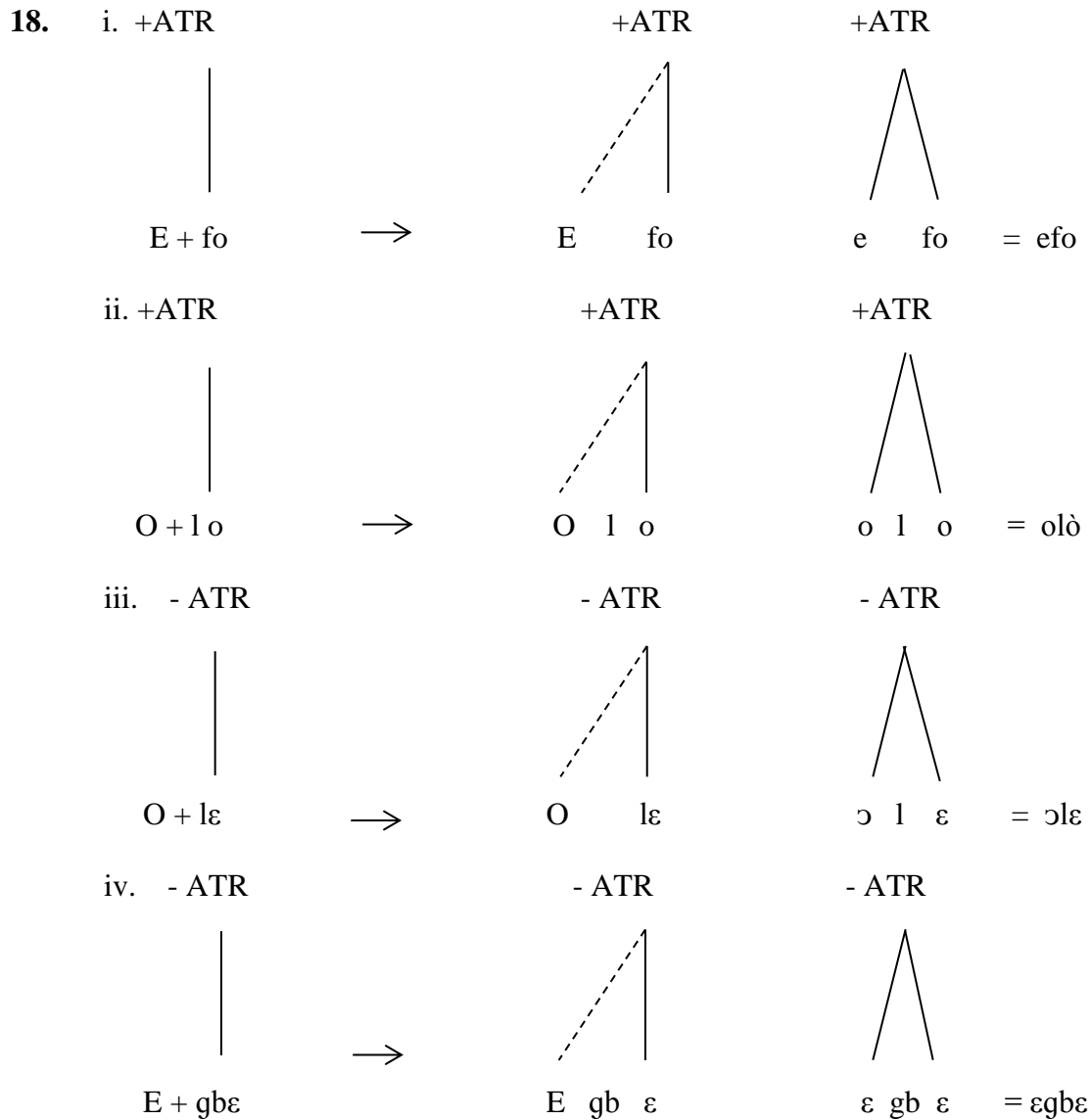
In view of the presentation above, our research shows that affix harmony is most preserved in Úwù when a mid-vowel is used as a prefix. High and low (i.e. neutral) vowels on the other hand do not in all cases reflect harmonic constraint when used as prefixes.

3. 2. Directional of spread

There are phonological and morphological domain restrictions which control in what direction the dominant feature may affect other vowels to assimilate (Archangeli & Pulley blank 2007: 363). Depending on where the dominant feature, also called trigger, is placed, the vowels to its left or right will be affected (Moller 2009: 5). This implies that the issue of harmonic spread usually comes up in a language where affixes harmonize with their roots. In some languages, prefixes trigger leftward spread while suffixes trigger rightward spread. The dominant harmony languages may display bi-directional feature spreading; leftward, by dominant suffixes, and rightward, by dominant prefixes (Casali 2008: 533). Because Úwù manifests a symmetric assimilation (also called root-controlled system) (see Moller (2009: 9)), root-vowels usually trigger leftward spread since affixes are mainly prefixes in the language. In Úwù, any of [+ATR] or [-ATR] feature may trigger harmonic spread so far any of the features is bore by the vowel of the root-word. It has been suggested that there is a strong tendency among ATR harmony languages to apply right to left spreading (p. 535). This is true of Úwù since affixes in Úwù are only prefixes. We have said earlier that affix harmony in Úwù best manifests in derived VCV-words (i.e. V + CV). Mid-vowels that are prefixed to a root often harmonize with the ATR feature of the vowel(s) of the root; hence we propose a leftward spread for directionality in Úwù with the assumption that the ATR feature of the mid-vowel-prefix is usually determined by the vowels of the CV-stem and never otherwise.

This assumption is also extended to the cases where high and low vowels (i.e. neutral vowels) as prefixes harmonize with the ATR feature of the vowel(s) of the root-word to which they are attached. Note that harmonic spread is not limited to words of “V+ CV” structures alone; it also involves words of other structures so far the prefix harmonizes with the initial vowel of its host. Directionality in Úwù is illustrated in 9 below:

17. i. e + fo → efo ‘hotness’
 ‘hot’
 ii. ó + lá → ólá ‘dream (N)’
 ‘dream (V)’
 iii. o + lo → olo ‘grinder’
 ‘beat drum’
 iv. a + gbε → agbε ‘planting’
 v. fɪ # adʒò → fadʒò → afadʒò ‘worker’
 do work
 vi. fo # àki → fàki → afàki ‘wash cloth’
 wash cloth

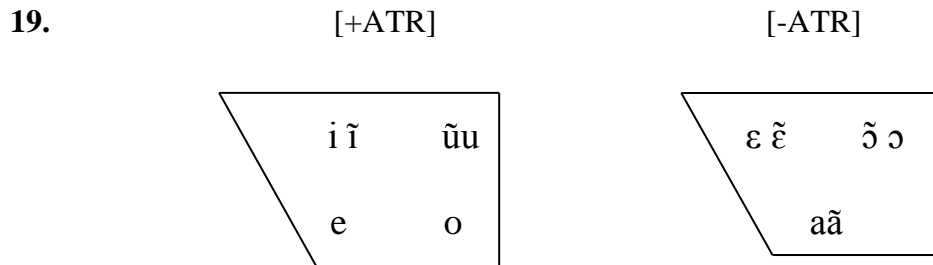


3. 3. Analysis of vowel harmony

In the sub-sections below, we present an autosegmental analysis of vowel harmony looking at both the regular and irregular harmony.

3. 3. 1. Regular harmony

By regular harmony, we refer to cases where only Advanced Tongue Root [+ATR] vowels co-occur, and where only Retracted Tongue Root [-ATR] vowels co-occur. We have shown the vowels as falling into two sets of [+ATR] and [-ATR]. This is represented below:



Note that /i, ĩ, u, ũ, a, ã / are neutral vowels. However, /i, ĩ, u, ũ / are [+ATR] while /a, ã / are [-ATR] vowels. Cases where these neutral vowels co-occur with their non-harmonic counterparts would be treated as cases of irregular harmony with respect to tongue root position. Note that regular harmony in Úwù is best illustrated in VCV structures.

In presenting an autosegmental analysis of the vowels with their appropriate ATR feature, [±ATR] constitutes autosegmental feature that must be represented on a separate tier parallel to the segmental tier. The autosegmental tier and the segmental tier must however be associated for the purpose of co-articulation. Association in the Úwù language, as will be shown in the derivations below, is accomplished subject to the well-formedness condition. We observe however that vowels [i, ĩ, u, ũ, a, ã] do not have harmonic counterparts, it is therefore possible to reduce the vowel system to five basic forms from which the twelve surface forms are derived by root controlled vowel harmony determined by [ATR]. The basic vowels are;

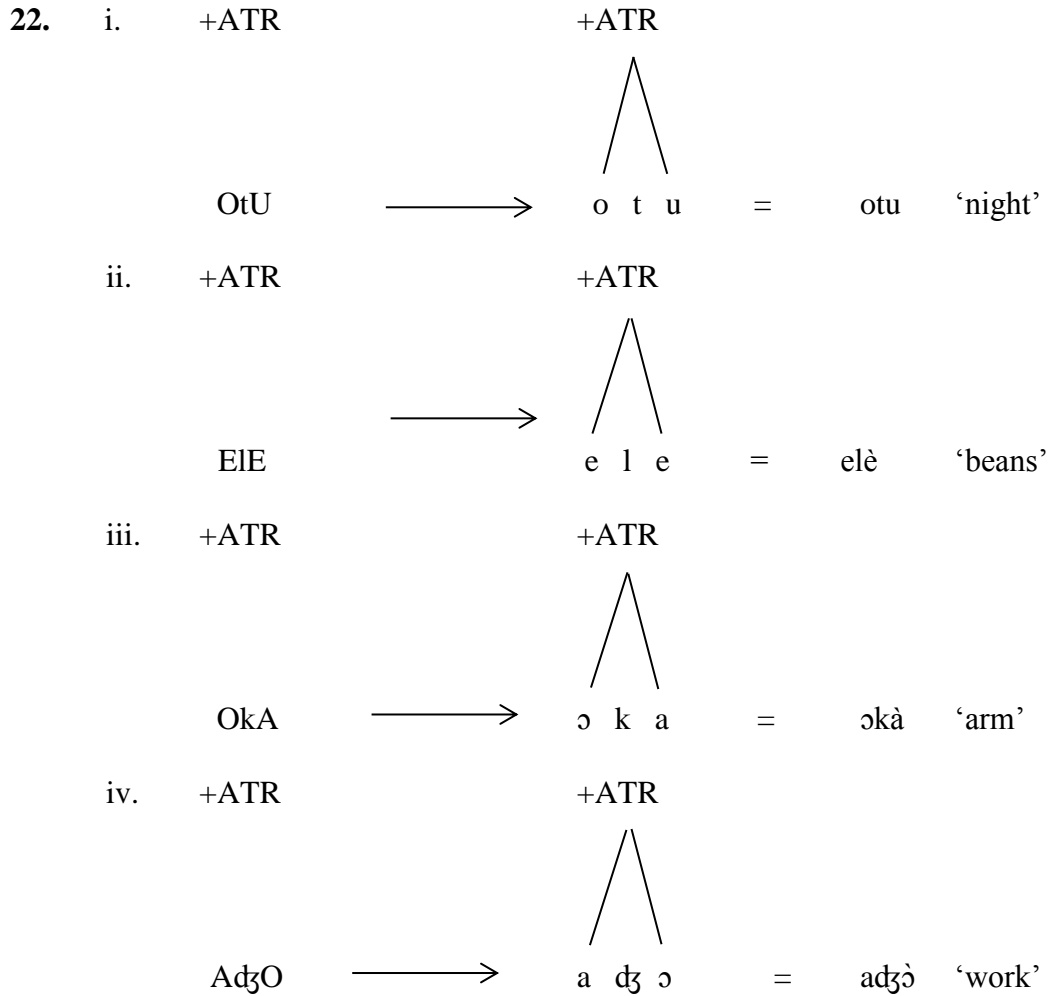
- 20.
- | | | |
|---|---|-----------|
| I | = | i, ĩ |
| U | = | u, ũ |
| E | = | e / ε, ε̃ |
| O | = | o / ɔ, ɔ̃ |
| A | = | a, ã |

Note that vowels like [e, i, ĩ, o, u, ũ] are underlyingly linked to [+ATR] autosegment, while others like [ε̃ɔ̃ aã] are linked by default rule to [-ATR]. Following the discussion so far, the following derivations explain the operation of the harmonic system.

21. (a) otu 'night'
elè 'beans'

ifu ‘stomach’
 ugo ‘navel’

(b) okà ‘arm’
 ɛdʒa ‘egg’
 adʒò ‘work’
 ɛlé ‘money’



The illustration above shows that the [±ATR] autosegment spreads to the segments at the segmental tier to derive the correct surface forms.

3. 2. 2. Irregular harmony

This describes cases where vowels from different harmonic sets co-occur in lexical items that are not the result of derivation arising from deletion. Such cases are also referred to as disharmonic sequences (Oladeji 2014). Going by the definition above, the following are presented as cases of irregular harmony in Úwù language;

23.	alè	‘ground’
	ugɔ	‘navel’
	ahi	‘stomach’
	ágo	‘head’
	ilá	‘fat’
	ehan	‘palm cannell shaft’
	éga	‘future tense morpheme’
	amúga	‘scissors’
	àtekú	‘knee’
	uwáfe	‘food’
	ìfèkpe	‘cane’
	èkíta	‘stone’
	anùwá	‘door (way)’

As one may observe, each of the lexical items presented in the data above consists of mixed vowels with reference to their ATR features.

3. 2. 3. Accounting for irregular harmony

Scholars have long recognized the presence of neutral vowels in a number of languages that operate vowel harmony. These are vowels that are capable of occurring with vowels outside their harmonic group. In this case, it involves the occurrence of [+ATR] vowels with [-ATR] vowels. Speaking on neutral vowels, Hulst and Smith (1986: 234) say:

...segments which occur at the interaction of two (harmonic) sets have a predictable value for the harmonic feature... such vowels are often called neutral, but one must be careful to distinguish two kinds of natural vowels. In one type of case, the neutral vowels appear to be transparent in the sense that the harmonic requirement...looks right through them, i.e. vowels occurring to their left harmonizes with vowels to their right (and vice versa) just as if the neutral segments were not there...In the second case, the neutral vowels are opaque, i.e. it is not necessary that vowels occurring on their side harmonize with each other.

A neutral vowel in Úwù is capable of occurring with vowels of other harmonic group as shown in 23 above. Following the definition contained in Hulst and Smith (1986: 235), it is possible to infer that neutral vowels in Úwù are not transparent; rather they are opaque because vowels cannot see through them; vowels occurring to the sides of the neutral vowel do not harmonize. Although, it is possible to have accidental cases that may be regarded as transparency due to the occurrence of certain neutral vowels like the once in the words presented below:

24.	otito	‘truth’
	ojipu	‘female’

atajò ‘pepper’
èpùrù ‘darkness’
erukutu ‘dust’

Akinlabi (2009) reports that neutral vowels are both transparent and opaque in Lokaa. Although he added that this is not common among languages that operate vowel harmony, Dettwiler (2001) had earlier claimed that the phenomenon manifests in C’lela. However in Yoruba language, there are few examples like:

25. òfùgbó ‘a cult’
ewúro ‘bitter leaf’
ògúfe ‘goat’

In spite of these examples, Scholars have argued consistently that neutral vowels are opaque in Yorùbá (see Awobuluyi 1967, Pulleyblank 1996, Abiodun and Sanusi 2001, and Oladeji 2014).

With reference to the examples in 24 above, one may propose that neutral vowels are both transparent and opaque in Úwù, however such examples that reflect transparency are very few compared to the lots of examples that show that neutral vowels are opaque. Aside that, it has been reported that neutral vowels are opaque in languages that attest partial harmony and in most languages with seven or nine vowel system; Clement (1976), Abiodun (2000), Unseth (2009), and Oladeji (2014) have all shown that neutral vowels [i, u, a] are opaque in Ewe, Ukaan, Wolof and Yoruba languages respectively. Hence, it would be more logical to argue for opacity than to claim that they can be both opaque and transparent. The few examples that show harmonization between neutral vowels and the vowels to their sides in some tri-syllabic words as shown in 24 suggests the possibility of Proto-Úwù operating a complete harmony system and the likelihood of neutral vowels being transparent in the diachronic form of the language. 24 above are likely the relics of the complete system after certain mergers have taken place in the vowel system. This suggestion is not strange. Abiodun (2000) reports that the complexity in the vowel system in Ukaan is the result of vowel merger, Oladeji (2014) in his study of the vowel system of North-East Yoruba dialect group suggests the possibility of merger among certain vowels in Yoruba and therefore hypothesized that Proto-Yoruba might have operated a ten-vowel system and by implication a complete harmony system. The opacity of these vowels in Úwù is reflected in:

26. èkíta ‘stone’
uwáfe ‘food’
àjìbà ‘mat’
anúwà ‘knee’
èdžidžá ‘star’
ódžmà ‘lie’
ajĩgò ‘bull’

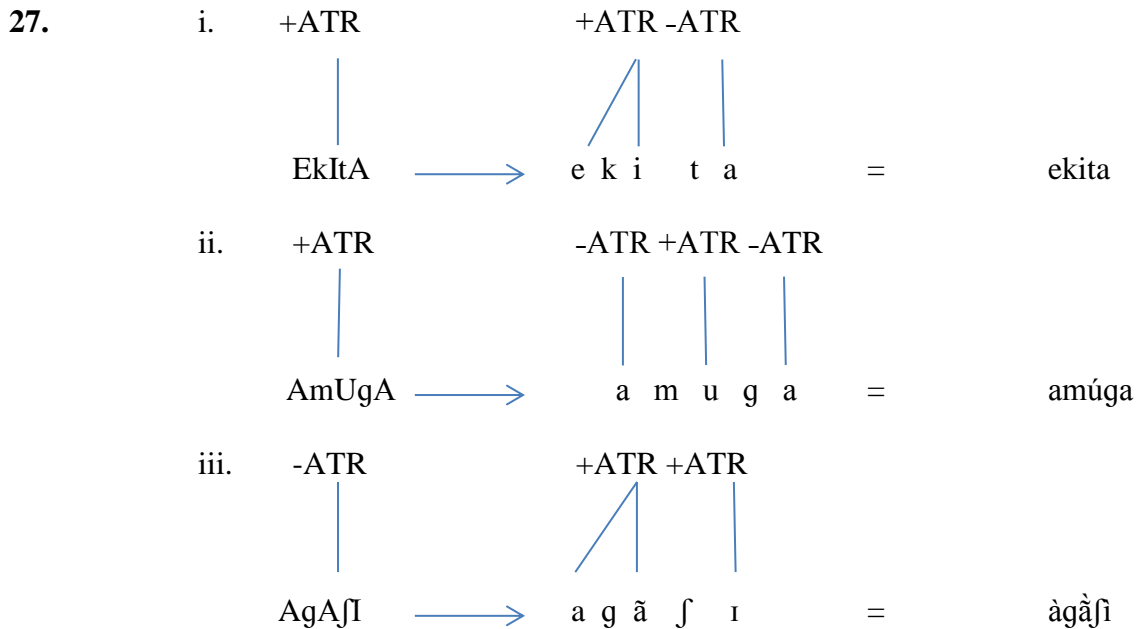
atite	‘guinea fowl’
amùfà	‘potter’
amuɣa	‘scissors’;
àgǎfĩ	‘horse’
ádžádžu	‘darkness’

Note that the [e] to the left of [i], and [a] to its right in [ekita] do not harmonize. Similarly, [u] and [e] both to the left and right of [a] do not harmonize with [a] in uwafe. This is equally true of [a] and [a], both to the left and right of [u] in anúwà which do not harmonize with [u].

In Accounting for opaque vowels in Ewe, Clements (1976: 64) says:

In underlying representation, they always occur either associated with an autosegment or else in a domain governed by that autosegment...

However, in accounting for the operation of disharmonic cases in Úwù, we posit that [ɪ ï u û] are prespecified as [+ATR] and [a ǎ] as [-ATR] in such constructions, and they are only allowed to spread leftward. Consider the illustration below:



4. CONCLUSION

Basically, three important findings emanate in this paper. First, Úwù operates a partial harmony system, consisting of seven oral vowels and five nasal ones. Second, harmonic spread is root-controlled, and direction of spread in Úwù is leftward since affixes in the language are mainly prefixes. Finally, neutral vowels are opaque in Úwù, although there are few cases where neutral vowels harmonize with vowels to their either sides, such cases are so few to conclude that the neutral vowels can be both transparent and opaque.

Biography

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