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Articulatory Harmony in Plural Formations in Dholuo Phonology

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Abstract
This study deals with Dholuo plural formations and attempts to move from the voicing polarity as the way of dealing with these plurals but instead looks at places of articulation as the major driving factor. The introductory component deals with the failure of the voicing polarity to adequately explain the behavior of these plural formations. A among the arguments dismissed in this paper include Alderete's position of voiceless segments becoming voiced in their plural forms ,Okoth Okombo's switch alpha rule which would not capture other forms such as *Ong'er-Ong'eche*(monkey-monkeys).This study therefore develops areas of articulations as the key in this harmony**.** The data available does not explain other plural changes such as *bul –bunde* (drum-drums). This clearly show that plural changes in Dholuo phonology in terms of segmental changes have not been fully explained, my approach to the plural formations is based on articulators as a prominent factor in the plural formations and whether voiced or devoiced is a factor determined by the welformedness constraints of the language in the sense that if the language does not allow a particular structure it will not be formed and if in so forming the plural there is a similar word then the language will get an alternative route either by using vowel lengthening or using the suffix *–ni* which would also still maintain the last segment of the noun especially in terms of place of articulation.

Introduction
The Luo dialect, *Dholuo* is the eponymous dialect of the Luo group of Nilotic languages, spoken by about 6 million Luo people of Kenya and Tanzania, who occupy parts of the eastern shore of Lake Victoria and areas to the south.
Dholuo is mutually intelligible with Alur, Lango, Acholi and Adhola of Uganda. Dholuo and the aforementioned Uganda languages are all linguistically related to Luwo, Nuer, Bari, Jur chol of Sudan and Anuak of Ethiopia due to common ethnic origins of the larger Luo peoples who speak Luo languages.
It is estimated that Dholuo has 90% lexical similarity with Lep Alur (Alur), 83% with Lep Achol (Acholi), 81% with Lango, and 93% with Dhopadhola (Adhola). However, these are often

counted as separate languages despite common ethnic origins due to linguistic shift occasioned by geographical movement.
Dholuo has two sets of five vowels, distinguished by the feature [+/-ATR].

[-ATR] vowels in Dholuo

	Front	Central	Back
Near-close	ɪ		ʊ
Mid	ɛ		ɔ
Open		ɐ	

[+ATR] vowels in Dholuo

	Front	Central	Back
Close	i		u
Mid	e		o
Open		a	

Consonants
In the table of consonants below, orthographic symbols are included between parentheses if they differ from the IPA symbols.

Phonetic inventory of consonants in Dholuo

		Labial	Dental	Alveolar	Palatal	Velar	Glottal
Nasal		m		n	ɲ (ny)	ŋ (ng')	
Plosive	prenasalized	ᵐb (mb)		ⁿd (nd)	ᶮɟ (nj)	ᵑg (ng)	
	voiceless	p	t̪ (th)	t	c (ch)	k	
	voiced	b	d̪ (dh)	d	ɟ (j)	g	
Fricative		f		s			h
Trill				r			
Approximant		w		l	j (y)		

In most literatures, Dholuo plural formations have always posed a lot of challenges with most researchers resorting to hypotheses which cannot be fully explained. Most researchers have come up with voicing polarity as a way of explaining the plural formations. Alderete (2001) cites voicing alternations in Luo plural and possession marking as compelling evidence for Trans derivational antifaithfulness (TAF) constraints. My paper argues for a different approach which

deals with harmony of the articulators as opposed to emphasis on the behavior of segments, the alternative approach is based on the interaction of faithfulness and markedness constraints in a containment based version of Optimality Theory (van Oostendorp, 2006b; Revithiadou, 2007).
Theoretical treatments of voicing polarity are shown in Okoth Okombo (1982) and comprehensive grammar of Kenya Luo is Tucker (1994) e.g
Voicing exchange [–voice] → [+voice]

Singular Plural
a. bat bed-e 'arm' (Okoth-Okombo, 1982:30)
b. luth ludhe-e 'walking stick' (Okoth-Okombo, 1982,p.30)
c. ri:p ri:b-e 'milky way' (p. 128)
d. guok guog-i 'dog' (Okoth-Okombo, 1982:30)
Voicing exchange [+voice] → [–voice]

Singular Plural
a. ki:d´ı k´ı:t-e 'stone' (p. 128) ˆ
b. OkˆE:bE ok´E:p-ˆE 'tin can' (p. 127)
c. cogo cok-e 'bone' (Okoth-Okombo, 1982,p.30)
Okoth Okombo's switch alpha rule has been dismissed as inadequate –voc +con αvoiced → [−αvoice] / [Pl -e].In a constraint-based framework such as Optimality Theory, rules of this type cannot be formulated. In fact, the Luo data seem to be highly problematic for OT which is basically restricted to faithfulness and markedness constraints (Moreton, 2004): The change from /d/ to /t/ in violates a faithfulness constraint (IDENT [voice]) and while devoicing of a stop reduces markedness, this does not explain why devoicing only happens in the plural, and not in the phonologically crucially identical singular form. Even if markedness constraints forcing devoicing could be restricted to the plural forms, this seems to be at odds with the fact that forms which have unvoiced stops in the singular voice them in the plural forms.
Alderete (2001) (the same analysis can also be found in(Alderete, 1999) takes these problems as evidence that OT must be complemented by a new constraint type, so-called trans derivational antifaithfulness (TAF) constraints which require that the output of a derived form
and the output of its morphological base differ for a specific property. More specifically,
Alderete assumes that for every faithfulness constraint such as IDENT [voice] there is a corresponding antifaithfulness. There are cases of –voc –voc as shown below in Okombo.(1982)

Singular Plural
a. ´ı:p i:p-e 'tail' (p. 130)
b. Nu:t Nu:t- ´ e 'neck' (p. 130) ˆ
c. la:k le:k-e 'tooth' (p. 130)
From the above data that is borrowed from Okombo (1982) which does not explain other plural changes such as *bul –bunde* (drum drums) ,*ong'er -ong'eche.*(monkey monkeys) among others clearly show that plural changes in Dholuo phonology in terms of segmental changes have not been fully explained, my approach to the plural formations is based on articulators as a prominent factor in the plural formations and whether voiced or devoiced is a factor determined

by the welformedness constraints of the language in the sense that if the language does not allow a particular structure it will not be formed and if in so forming the plural there is a similar word then the language will get an alternative route either by using vowel lengthening or using the suffix *–ni* which would also still maintain the last segment of the noun especially in terms of place of articulation. The vowel changes in plural formations would also maintain the last segment of the noun in terms of place of articulation.

Data Analysis and Discussions

The nouns ending with voiced alveolar trill /r/ changes to voiceless affricate/ch/

Singular	**Plural**	**Gloss**
ong'er	ong'eche	monkey- monkeys
bur	buche	hole-holes/boil-boils
aluru	aluche	quil-quils
kwer	kweche	tradition-traditions

From the above data the trill /r/ is articulated at the alveolar ridge which translates to the voiceless affricate /ch/ which is also articulated at the alveolar ridge. This is the extent of the harmony of the articulators which is maintained.

The nouns ending with voiced lateral approximant/l/ changes to voiced pre-nasalized/nd/

Singular	**plural**	**Gloss**
Bul	bunde	drum-drums
Thuol	thuonde	snake –snakes
Tol	tonde	snake-snakes
Pala	pende	knife-knives

The above data shows relationship between /l/ and /nd/ in terms of place of articulation as both segments are articulated at the alveolar ridge. However, there are exceptions such such /l/ to /k/ as in words such as *diel-diek* (goat-goats),an addition of the suffix *–ni* as in *dala-delni*(home-homes)

The nouns ending with voiceless/p/,/k/ and /t/ changes to voiced /b/,/g/ and /d/ respectively.

Singular	**plural**	**Gloss**
Pap	pebe	field-fields
Wat	wede	relative-relatives
Guok	guogi	dog-dogs

From the above data we realize that the voiceless/p/ and voiced /b/ are both bilabials. The voiceless /t/ and voiced /d/ are both articulated at the alveolar ridge. The voiceless /k/ and the voiced /g/ are both articulated at the velar.

The nouns ending with voiced, /g/ and /d/ changes to voiceless /k/ and /t/ respectively.

Singular	**plural**	**Gloss**
Tugo	tuke	play-plays
Kado	kate	soup-soups

From the above data we realize that the same areas of articulations are maintained.

The nouns ending with nasals, /n/ and /m/ changes to pre-nasals /nd/ and /mb/ respectively.

Singular	**plural**	**Gloss**
Thuno	thunde	breast-breasts

Bam bembe thigh –thighs
Lum lumbe grass-grasses
Thum thumbe music-a lot of music

From the above data we realize that the alveolar nasal /n/ changes to the /nd/ the pre-nasal which is also alveolar. The bilabial nasal /m/ changes to the pre-nasal /mb/ which is also bilabial.

The nouns which maintain their consonant segments both in singular and plural forms.

Singular	**plural**	**Gloss**
Dayo	deye	grandmother-grandmothers
Jaduong'	jodongo	oldman-oldmen
Wang'	wenge	eye –eyes
Wach	weche	word/issue-words/issues
Lak	leke	tooth-teeth'
Winy	winyo	bird-birds
Niang'	nienge	sugar cane-sugar canes

From the above data the segments have been maintained hence the areas of articulations.

The nouns ending with voiced palatal approximant /j/ changes to voiceless affricate /ch/.

Singular	**plural**	**Gloss**
Taya	teche	lamp-lamps.

From the above examples, we don't see the sharing of the places of articulation but we see the switch of the articulators from palatal area to the alveolar ridge. The opposite of this switch is also seen in the examples below. This happens because the language allows such for the welformedness purposes.

The nouns ending with voiceless affricate /ch/. Changes to voiced palatal approximant /j/

Singular	**plural**	**Gloss**
Wich	wiye	head-heads
Ich	iye	stomach-stomachs
Rech	reye	fish-many fish

From the above data we find the switch in the areas of articulation from the alveolar ridge to the palatal area, the opposite of the data in a above.

The nouns ending with voiceless affricate /ch/. Changes to voiced affricate /d3/

Singular	**plural**	**Gloss**
Tich	tije	job-jobs
Ng'ech	ng'eje	a kind of an animal

From the above data the area of articulation is maintained that is the alveolar ridge.

The nouns ending with voiceless dental fricative /th/. Changes to voiced dental fricative /dh/

Singular	**plural**	**Gloss**
Olith	olidhe	falcon-falcons
Ruath	ruedhi	bull-bulls
Luth	ludhe	bigger stick-bigger sticks

From the above examples the dental area of articulation is maintained.

The nouns ending with voiced dental fricative /dh/. Changes to voiceless dental fricative /th/

Singular	**plural**	**Gloss**
Puodho	puothe	farm-farms
Budho	buthe	pumpkin-pumpkins

The data above reveals that the place of articulation is maintained

The nouns ending with voiced velar nasal /ng/. Changes to voiceless velar stop /k/

Singular	**plural**	**Gloss**
Dhiang	dhok	cow-cows

The data above reveals that the place of articulation is maintained

The nouns that involve the addition of the suffix *–ni* in the plural formations.

Singular	**plural**	**Gloss**
Dala	delni	home-homes
Agulu	agulni	pot-pots

From the data above we realize that in a case where places of articulation is not shared or switched or maintained then the *suffix-ni* is introduced.

The nouns ending with the semi vowel /w/ Changes to voiceless affricate /ch/.

Singular	**plural**	**Gloss**
Tuwo/two	tuoché	sickness-sicknesses.

From the data we see switch from bilabial to alveolar ridge.

The nouns ending with the trill /r/ Changes to voiceless palatal /j/ or vowel /e/.

Singular	**plural**	**Gloss**
Kwer	kweye/kwe	hoe-hoes

From the data we see switch from alveolar ridge to palate

The nouns ending with the voiceless vela stop /k/ and Changes to different sounds showing switch in places of articulations.

Singular	**plural**	**Gloss**
Dhako	mon	woman-women
Nyako	nyiri	girl-girls

From the data we see switch from velar region to alveolar ridge.

Conclusion

From the above analysis we realize that plural formation is not an emphasis on voicing polarity but instead looks at places of articulation as the major driving factor which tend to explain more plural formations than the voicing and devoicing factor. The plural formations show similarity in the areas of articulation in terms of articulators and where areas are not shared, we find switch in the articulators either from front to back or from back to front. Some plurals retain their forms and instead use vowel changes to reveal plural formations. There are also cases where the suffix *–ni* is used to reveal the plurals.

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