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MORPHOLOGY AND PHONOLOGY INTERFACE: URHOBO NUMERALS

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Abstract
This study presents a morpho-phonological analysis of Urhobo numerals, aiming to explore their structural components and formation processes. By identifying the various morphological methods employed in deriving numerals in Urhobo, the research sheds light on the complexities of this aspect of the language. The investigation focuses on the phonemes, syllable structures, and phonological processes that contribute to the realization of numerals. Data for this analysis were gathered through interviews, where informants provided the Urhobo equivalents of English numerals. A descriptive approach was utilized for data analysis, leading to insightful findings. The results reveal that affixation, reduplication, and compounding are key word formation processes in the derivation of Urhobo numerals. Moreover, the research indicates the presence of seven oral vowels and three nasal vowels in Urhobo numerals, complemented by thirteen consonant sounds. The predominant syllable structure observed in Urhobo numerals is the consonant-vowel (CV). Among various phonological processes, deletion emerged as the most frequently observed in these numerals. Overall, this study highlights the significant interplay between morphology and phonology in Urhobo numerals, contributing to a deeper understanding of the language's structure.

Keywords: Interface, Morphology, Numerals, Phonology, Urhobo

1. Introduction

The interface between morphology and phonology has consistently held a key position in linguistic theory, as it explores how the structure of words relates to their phonological forms (Haugen, 2008). Morphology focuses on the internal organisation of words and the principles governing their formation (Haspelmath & Sims, 2013), while phonology is the branch of linguistics that studies the sound systems and the laws governing the combination of sound segments in a language (Idsardi & Monahan, 2016). At the junction of these two areas, morphological processes such as affixation, compounding, and reduplication often prompt phonological phenomena like segment alternation, vowel harmony, segment deletion, or assimilation. Numeral systems, in particular, provide an excellent context for interface investigations because they often feature intricate morphological constructions whose phonological representations are influenced by grammatical and prosodic factors (Inkelas, 2014).

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Urhobo, a South-Western Edoid language predominantly spoken in Delta State, Nigeria, displays unique morphological and phonological characteristics that have not been thoroughly documented in existing literature. Like numerous Niger-Congo languages, Urhobo relies heavily on tone, vowel harmony, and constraints on syllable structure, all of which interact with morphological operations. The numerals in Urhobo extend beyond straightforward lexical entries; higher numerals often entail compounding, derivation, and at times, strategies that are either multiplicative or additive (Osaigbovo, 2015). These morphological techniques can induce phonological variations, such as tonal shifts or segmental modifications, making the numeral system an ideal subject for exploring the morphology–phonology interface.

Despite the increasing amount of research on African languages, comprehensive studies centred on the interface concerning Urhobo numerals remain limited. Current descriptions of Urhobo have often treated morphology and phonology as largely separate elements, leading to a lack of clarity about how numeral formation functions across these grammatical levels. Therefore, an examination of the morphology and phonology interface in Urhobo numerals is essential to provide a more cohesive understanding of the language's grammatical framework. Such research not only enhances the descriptive documentation of Urhobo but also offers empirical data that can contribute to broader theoretical discussions on interface phenomena in natural languages, particularly within the framework of Niger-Congo languages.

2. Methodology

Data were collected by compiling a wordlist of the Urhobo and English numeral systems. It was made possible by the help of the three informants, who were native speakers of Urhobo, residing in Agbarho town, Ughelli North LGA in Delta State, between the age range of 40- 59. They were engaged in interviews to provide the equivalents of the English numerals in the Urhobo language. These interviews were recorded by means of a digital voice recorder.

The wordlist was grouped into three types of numerals: cardinal, ordinal, and distributive. The cardinal numerals are 1-100, ordinals (1st-5th), and distributive numerals (one each, forty each). The secondary data presented in this work are drawn from existing works on the numeral systems of English and some Nigerian languages.

The descriptive method was adopted in the analysis of data in order to do proper analysis of the data to show the behaviour and various strategies in the realization of the numerals of Urhobo.

3. Morphological Analysis of Urhobo Numerals

In this section, the numerals would be analyzed by grouping the Urhobo numerals and identifying the different morphological processes that are involve the the formation of numerals in the language.

3.1. Urhobo Numerals Typology

Across the three types of numerals of Urhobo: cardinal, ordinal and distributive numerals, the numerals of Urhobo can be grouped into monomorphemic numerals and Polymorphemic numerals.

a. Monomorphemic Numerals

These are numerals that are made up of just one morpheme. Some cardinal numerals of Urhobo fall under this typology. Examples below;

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numerals	gloss	numerals	gloss
óvó	'one'	Èsán	'six'
íve	'two'	ìghwrén	'seven'
Èrhá	'three'	èréren	'eight'
Ènè	'four'	ìrhírin	'nine'
ìyòrìn	'five'	íhwè	'ten'

b. Polymorphemic Numerals

These are numerals that are made up of more than one morpheme. Some cardinal numerals of Urhobo fall under this typology. Examples below;

Numerals	Gloss	Numerals	Gloss
ihwe + ọvo => íhwọvo ten one	'eleven'	Újé + gbẹ + óvó => ujegbọvo twenty and one	'twenty-one'
ihwe + ivɛ => íhwivẹ ten two	'twelve'	Uje + ivẹ twenty two =>ùjúvè	'forty'
Íhwè+gbẹ+ésán=>ihwegbesan ten and six	'sixteen'	Ùje + ivè + gbẹ + íhwè => Ùjuvègbíhwè	'fifty'
Íhwè+gbẹ+ighwren=>íhwègbíghwrén ten and seven	'seventeen'	Ùje + iyorìn twenty five =>ùjórìn	'one hundred'

3.2 Morphological Processes in Urhobo Numerals

There are word formation processes involved in the formation of Urhobo numerals, these are: affixation, reduplication and compounding. These different processes would be analyzed and discussed below;

i. Affixation

This is the process of adding an affix to a root word to form a new word in a language. This is evident in Urhobo ordinal numerals. Examples below;

	Gloss	Ordinal Numerals
a	first position	òrẹ + óvó => òróvó the one that is one

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second position	òrẹ + ívé => òrívé the one that is two	
third position	òrẹ + érhá=> òrérhá the one that is three	
Fourth position	òrẹ + éné => òréné the one that is four	
Fifth position	òrẹ + íyorin => òríyorin the one that is five	

ii. Reduplication

This is the process of repeating a part of a word or the full word in order to get a new word in a language. This is also evident in Urhobo numerals. Examples below;

	Gloss	Distributive Numerals
a.	one each	óvó + óvó => òvúóvó one one
	two each	Ìvè + Ìvè =>ìvívé two two
	three each	Èrhà +Èrhà =>èrhérhá three three
	four each	Ènè + Ènè =>ènìéné four four
	five each	ìyòrìn+ìyòrìn=>ìyínyórín five five
	ten each	Íhwè + Íhwè =>ìhwíhwé ten ten
	twenty each	újé + újé =>ùjújè twenty twenty
	thirty each	ógbàn + ógbàn=>ògbógbàn thirty thirty
	forty each	ùjúvè + ùjúvè =>ùjújúvè forty forty

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iii. Compounding

This is the process in which two or more root words are combined to form a new word in a language. This is also evident in Urhobo numerals. Examples below;

I. Cardinal numerals examples

	Gloss	Cardinal numerals
a	Eleven	ihwe + ọvo => íhwọvo ten one (10 +1)
	thirteen	ihwe + erha => íhwerha ten three (10 +3)
	Fifteen	ihwe + iyorin=>íhwìyórín ten five (10 +5)
	Sixteen	Íhwè+gbẹ+ésán=>ihwegbesan ten and six (10 +6)
	Seventeen	Íhwè+gbẹ+ighwren=>íhwègbíghwrén ten and seven (10 +7)
	twenty one	Újé + gbẹ + óvó => ujegbọvo twenty and one (20 + 1)
	Forty	Uje + ivẹ => ùjúvè twenty two(20 x 2)
	Fifty	Ùje + ivè + gbẹ + íhwè => Ùjuvègbíhwè twenty two and ten (20 x 2 +10)
	Sixty	Ùje + erhà => ùjórhà twenty three(20 x 3)
	Seventy	Ùje + erhà + gbẹ + íhwè =>ùjórhàgbíhwè twenty three and ten(20 x 3 + 10)
	Eighty	Ùjé + ẹnè =>ùjénè twenty four(20 x 4)
	Ninety	Ùje + ẹnè + gbẹ +íhwè => ùjónègbíhwè twenty four and ten(20 X 4 +10)

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one hundred Ùje + iyorìn =>ùjórìn
twenty five(20 X 5)

	Gloss	Distributive numerals
a.	one each	óvó + óvó => òvúóvó one one
	two each	Ìvè + Ìvè =>ìvívé two two
	three each	Èrhà +Èrhà =>èrhérhá three three
	four each	Ènè + Ènè =>ènìéné four four
	five each	ìyòrìn+ìyòrìn=>ìyínyórín five five
	ten each	Íhwè + Íhwè =>ìhwíhwé ten ten
	twenty each	újé + újé =>ùjújè twenty twenty
	thirty each	ógbàn + ógbàn=>ògbógbàn thirty thirty
	forty each	ùjúvè + ùjúvè =>ùjújúvè forty forty

4.0 Phonological Analysis of Urhobo Numerals

This section would examine the data by identifying the phonemes and syllable structure of the Urhobo numerals.

Phonemes

From the data presented, Urhobo numerals have seven oral vowels and three nasal vowels, [a,e,ɛ, i,o,ɔ,u, ã,ẽ,ĩ,] and thirteen consonant sounds, [b,gb,ɣ,kp, s,ʒ,v r,ɾ n, j, h,w].

Syllable

In the Urhobo numerals, the open-syllable typology is adopted because all numerals end in a vowel, based on the data presented. Most of the basic numerals are always bisyllabic words, which means they are made up of two syllables. Data no.1 - attested this: v.cv. basic numerals (1,2,3,4,6,7 and 10) have two syllables, with the exception of (5,8 and 9), which

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have three syllables; they attested this: v.cv.cv. All non-basic numerals are polysyllabic words with three-five syllables.

Urhobo numerals start with vowel sounds alone. Since numerals are nouns, and in Urhobo all nouns must start with a vowel sound, the rule was rightly applied in their numerals. The following data are presented below to better explain the analysis:

a.	/ijĩjorĩ/	v.cv.cv.cv	'five each'
b.	/ijorĩ/	v.cv.cv	'five'
c.	/esã/	v.cv	'six'
d.	/ɔgbãgbɛ̀nè/	v.cv.cv.cv	'thirty-four'
e.	/ekpaijorĩ/	v.cv.v.cv.cv	'ten naira'
f.	/ekpaihwe/	v.cv.v.ccv	'twenty naira'
g.	/ìhwivɛ́/	v.ccv.cv	'twelve'
h.	/ìhwera/	v.ccv.cv	'thirteen'
i.	/ìhwegbesã/	v.ccv.cv.cv	'sixteen'
j.	/ìhwegbɛ̀rerẽ/	v.ccv.cv.cv.cv	'eighteen'
k.	/úʒègbɔvo/	v.cv.cv.cv	'twenty-one'

4. Morphology and phonology interface in Urhobo Numerals

The morpho-phonological analysis of Urhobo numerals reveals a tight interconnection between morphological processes and phonological rules. When forming larger numerals, the base numerals retain their individual phonological features, but these features can be altered to fit the phonological constraints of the language.

In this section, the data presented above would be analysed by giving the two representations, underlying representation and surface realization, then the differentphonological processes happening in the data would be clearly described.

The following are the phonological processes found in Urhobo numerals:

1. **Deletion**
   Deletion is addressed in two ways because of the behaviour of the data. The data were grouped into two types of deletion: simple segment deletion and complex segment deletion.

a. Simple Segment Deletion

This is the deletion of one segment only, which can either be a vowel or a consonant sound. Analysis below:

i. /ìhwɔvo/

Underlying representation		*Surface realization*
/ihwe # ɔvo /	=>	[ihwɔvo]
ten one 'eleven'		

ii. /ìhwivɛ́

/ihwe # ivɛ/	=>	[ihwivɛ]
ten two		'twelve'

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iii. /ìhwegbesã/
/ihwe # gbe# esã/ => [ihwegbesã]
ten plus six 'sixteen'

iv. /esisera/
/esiso # era/ => [esisera]
sack three 'six hundred naira'

v. /esìsívɛ̀/
/esiso # ivɛ/ => [esisivɛ]
sack two 'four hundred naira'

vi. /ɔrívɛ̀/
/ɔrɛ # ivɛ/ => [ɔrivɛ]
that of two 'second position'

vii. uʒuʒè/
/uʒe # uʒe/ => [uʒuʒe]
twenty twenty 'twenty each'

viii. /ɔgbɔgbã/
ɔgbã # ɔgbã/ => [ɔgbɔgbã]
thirty thirty 'thirty each

From the analysis above, it is obvious that the two vowels at the word boundary, v_1 is always deleted when there is a need for deletion because vowel sequence is not allowed at the surface level in the Urhobo language. When there are two vowels occurring in a sequence, one of the vowels either deletes or becomes a nonsyllabic glide.

In the data analysed, it is only the deletion of one of the vowels, that is, the deletion of v_1 at the surface level.

b. Complex Segment Deletion

This is the deletion of more than one segment at a time, which can either be consonants or vowels only, or a combination of both. Analysis below:

Underlying representation *Surface realization*

/ uʒuʒuvɛ̀/

/uʒuvɛ # uʒuvɛ/ => /uʒuʒuvɛ/

forty forty 'forty each'

/ijĩjorĩ/

/ijorĩ # ijori#/ => /ijĩjorĩ/
five five five each

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In the data analysed above, three segments were deleted in the process of realizing the surface level. This is the reason this kind of deletion was referred to as a complex segment deletion.

2. Vowel Hiatus

Although the data presented under this is not one word at the underlying representation, in the language, when talking about numerals, the word is made into one word. Hence, grouping them under this phonological process. Analysis below:

	Underlying representation		*Surface realization*
a.	/ekpaijorĩ/		
	/ekpa # ijorĩ/	=>	/ekpaijorĩ/
	calabash five		'ten naira'
b.	/ekpaihwe/		
	/ekpa # ihwe/	=>	/ekpaihwe/
	calabash ten		'twenty naira'
c.	/ekpauʒe /		
	/ekpa # uʒe/	=>	/ ekpauʒe /
	calabash twenty		'forty naira'

From the analysis above, it is realized that vowel hiatus is seen in Urhobo numerals, when two vowels are in sequence, and the v_1 is the open vowel [a], while the v_2 is either the front high vowel [i] or the high back vowel [u]; no vowel is deleted, thus, vowel hiatus.

3. Vowel Backing

In order to get this phonological process, two phonological processes took place. These phonological processes are deletion and insertion. Below is the analysis:

	Underlying representation		*Surface realization*
a.	/uʒuvɛ/		
	/uʒe # ivɛ/	=>	/uʒuvɛ/
	twenty two		'forty'
b.	/uʒora/		
	/uʒe # era/	=>	/uʒora/
	twenty three		'sixty'
c.	/uʒɔne/		
	/uʒe # ɛne/	=>	/uʒɔne/
	twenty four		'eighty'

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From the data analysed above, it is observed that the two vowels in sequence at word boundaries in the data at the underlying form get deleted totally, then a new vowel is inserted to replace the two vowels deleted. This vowel is different from the vowels deleted; they are front vowels, while the vowel inserted is a back vowel. The data are analysed as having the vowel backing phonological process because all the vowels inserted in the data at surface realization are back vowels, just like the initial vowels in the different Surface realisations of the data.

4. Glide formation

This phonological process is rarely attested in the numerals of Urhobo. Below are the analysis of the data that attests this phonological process.

	Underlying representation		*Surface realization*
a.	/ɔvwɔvo/		
	/ɔvo # ɔvo/	=>	/ɔvwɔvo/
	one one		'one each'
b.	/ɛ̀njɛ́nè/		
	/ɛne # ɛne/	=>	/ɛ̀njɛ́nè/
	four four		'four each'

In data 4a), the two vowels in sequence [o and ɔ] are back vowels, and the v1 is a low vowel; therefore, it changes to [w]. while the data 4b), the two vowels in sequence are both front vowels, and the v1 is a high vowel, hence, it changes to [j] as observed from the analysis above.

5. Nasalization

	Underlying representation		*Surface realization*
a.	/ijĩjorĩ/		
	/ijorĩ # ijorĩ/	=>	/ijĩjorĩ/
	five five		'five each'
b.	ijorĩ/		
	/ijorin/	=>	/ ijorĩ/
	five		'five'
b.	/esã/		
	/esan/	=>	/esã/
	six		six
c.	/ɔgbãgbɛ̀nè/		
	/ɔgbã # gbɛ # ɛne/	=>	/ɔgbãgbɛ̀nè/
	thirty and four		'thirty-four'

In data (5b) above, the nasal consonant in the datum did not spread its feature to the vowels surrounding it.

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There is also nasal stability in Urhobo, because in data (5a) above, after the deletion of segments(orĩ) at the surface level, the nasal feature-bearing unit, which is the last vowel that was also deleted, did not delete the nasal feature, but transferred the nasality feature to the nearby segment.

Donwa –Ifode (1996) opines that all nasal vowels are derived from the loss of preceding nasal consonants. This is attested in the data (5b and 5c) above. At the underlying level, there is a nasal consonant preceding the last vowel, but at the surface level, the nasal consonants were deleted, since there is nasal stability, the nasal feature the consonants bore was transferred to the nearby vowels.

5.0 Conclusion

Urhobo numerals are a fascinating example of the interplay between morphology and phonology. The language's system of numerals demonstrates how sound patterns and word structures are closely tied together, with processes such as compounding, reduplication and affixation, creating a coherent numeral system. Understanding the morpho-phonological processes behind Urhobo numerals not only describes the structure of the language but also its use in everyday communication.

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