Aspects of Morphophonology in Igbo Language

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Abstract
Morphophonology in Igbo is concerned with the processes which result to different phonological realizations of allomorphs of morphemes or the processes in which the phonemic representation of morphemes are realized in different environments. This paper is a study of aspects of morphophonology, and subsequently, the morphophonemic processes existent in the Igbo language. The purpose of this paper is to describe the morphophonological processes realized in Igbo language. The data for this study are collected through verbal interactions with native speakers and intuition of the researchers. The data are qualitatively analyzed using the descriptive method. From the data, it is observed that there are morphophonemic processes in Igbo language. The morphophonemic processes described are: 'negative suffixation *-GHI* which is realized as (ghi/ghị) based on vowel harmony rule'; This depicts two groups of Igbo vowels (+ATR/-ATR). Vowels are selected from one group in forming Igbo words. It is either you select from one group or the other because selecting haphazardly will result to ungrammaticality and unacceptability. The three operating tones in Igbo language, high (´), low (`), and down-step (ˉ) tones are distinctive and can result to different meanings from forms that appear similar. The past tense rV marker obeys the vowel harmony rule. In an environment where the main verb is from +ATR group, the rV follows the group vice versa.
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Introduction
Linguists generally acknowledge that there exists an inevitable inter-relationship between different levels of linguistic analysis, thus: phonetics, phonology, morphology, syntax and semantics. Various linguistic labels are used to describe such a link. In particular, there exists a bridge between the phonology and morphology of languages spoken all over the world. Phonology is one of the branches of linguistics which discusses about sound patterns in a language. Basically, phonology is the study of sound changes and sound production in a particular language. The 'phoneme' is the smallest distinctive unit of sound. Some of the phonological processes evident in languages are: (1) assimilation; (2) elision; (3) labialization; (4) palatalization; (5) lenition; (6) fortition; (7) nasalization; (8) laryngealization; (9) pharyngealization, etc. Morphology is defined as the study of the morphemes and their arrangements in building new larger morphological constructions. Morph is a physical form representing some morphemes in a language. Morpheme is the minimal unit of linguistics in certain languages. From word formation viewpoint, a new word in English and the subsequent change of the form of the morpheme can be analyzed through two main formation processes. The morphological process is of two main types, viz: affixation and non-affixation. Affixation consists of two formations, *internal change*, and *zero modification*. In affixation, there are some processes involved, some of which are: (1) compounding; (2) blending; (3) borrowing; (4) coinage; (5) clipping; (6) backformation; (7) conversion; (8) acronym; (9) reduplication, and (10) multiple processes.

There are some aspects of language where the *phonological* and the *morphological* levels of language interact. This interaction or alteration results to a sub-field known as morphophonology. According to Dwi (2015), morphophonemic processes are classified into ten, thus: (1) loss of phonemes; (2) addition of phonemes; (3) simple consonant change; (4) assimilation; (5) dissimilation; (6) synthesis; (7) change of syllabic vowel or diphthong; (8) stress shift; (9) gradation, and (10) suppletion.

This paper investigates the areas where phonology and morphology interact in the Igbo language, and identifies the processes involved, as well as the linguistics components that emanate from such alterations.

The Concept of Morphophonology

Morphophonology is derived from two words; morphology (the study of morphemes), and phonology (the study of phonemes). The term 'morphophonemic' is derived from two words, and they are *morpheme* and *phoneme*. Morphophonemic processes have relation between morphology and phonology. In the same way, morphophonemics not only talks about 'morphology' but also 'phonology'. The word 'morphophonemics' refers to variation in the form of morphemes because of the influence of phonetic factor or the study of this variation.

Morphophonemics is the branch of structural linguistics that studies the variations or changes in the phonemic structure of allomorphs of two or more morphemes which combine to form a new derivational as well as inflectional word forms. The morphophonemic process studies the phonological realization of the allomorphs of the morphemes of a language. It is the study of the phonemic representation of morphemes in different linguistic environments. The term "morphophonemics" is generally used to describe linguistic statements that can be made up of the phonemic structure of morphemes, and their effect on the grammatical content of languages. Related to the affixation processes, is a term called morphophonemic processes (Fromkin, 1990: 141).

"The form change of morpheme is based on the sounds surrounding it which relates to the correlation between morphemes and phonemes. This change is also called morphophonemic changes" (Parera 1982:42). According to Ramlan (2001), morphophonemics refers the changes of phoneme as a result from the merging of one morpheme and another. He also notes that morphophonemic process is a process of form changes in which phoneme and morpheme are involved. It can also be said that, morphophonemics is the study of the phonemic representation of morphemes in different environments. What is to be noted here is that, the description of changes in the phonemic structure is analyzed from the viewpoint of synchronic linguistics, not the diachronic one. Synchronic linguistics deals with formulating the simplest possible description of the existing structure of a language, whereas diachronic or historical linguistics is concerned with the most accurate description of the changes that have occurred during the history of a language. In noticing the phonemic change in the structure of allomorphs of the morphemes that combine into a new word, it is considered that one allomorph is the normal form while the other(s) is the variation(s) or changes from the normal (Dwi, 2011).

Haspelmath & Sims (2010) note that phonological allomorphs are interesting because they represent the point of intersection between morphological and phonological structures. Thesaurus dictionary (2021 ed.) defines morphonology or morphophonology as the study of the relations between morphemes and their phonological realizations, components, or mappings. It deals with the phonetic alternations of morphemes across morpheme boundary. It is also termed morphophonemics. A morphophonemic rule has the form of a phonological rule, but is restricted to a particular morphological environment. Morphophonemic variations occur at morpheme boundaries and it involves sounds that are associated with separate phonemes. A word's pronunciation can be sensitive to morphological factors. For example, in the English word 'electric' /elektrik/ the final sound is a voiceless velar stop, but when added with an /-ity/ suffix, the new word 'electricity' /elektrisity/ the /k/ changes to /s/, a voiceless alveolar fricative.

Types of Morphophonemic Change

Grady et al. (1996) cited in Dwi (2011), discusses some types of morphophonemic change which are: (1) loss of phonemes, (2) addition of phonemes, (3) simple consonant change, (4) assimilation, (5) dissimilation, (6) synthesis, (7) change of syllabic vowel or diphthong, (8) stress shift, (9) gradation and (10) suppletion. These types of morphophonemic processes are discussed in detail below:

Loss of phoneme

The phenomenon of loss of phonemes occurs when one or more phonemes that are present in the normal allomorph of a morpheme may simply be missing in another allomorph. For example, the English morpheme [in-], which is the normal allomorph of the negative prefix [in-], appears constant in combination with allomorphs beginning with vowels or with the consonants /t, d, k, g, f, v, s, j, h/ such as in: *inert*, *intemperate*, *indirect*, *incorrect*, *ingratitude*, *infelicity*, *invisible*, *insecure*, *injustice*, *inhospitable*. But before morphemes beginning with /m, r, l/ and usually /n/, another allomorph, simply /i-/ appears, as in: *immodest*, *irreligious*, *illegal*, *innocuous*. Here, the /n/ of the normal form is dropped before /m, r, l, n/. Another example of a lost consonant phoneme is the /t/ of the stem (-crat) before the derivational (-cy), as in: *democracy*, *aristocracy*, etc. The loss of a consonant phoneme is a common morphophonemic change.

Vowel phonemes may also be lost but less commonly than consonants. For example, the normal allomorph of (veget-) is /vejət-/, as in *vegetate* and its derivatives, but the allomorph /vejt/occurs in *vegetable*. Likewise the regular allomorphs of (-es) is considered /-iz/ as having lost the vowel phoneme /-s/ this exhibits the same loss of vowel together with further change of 'unvoicing'. Some other pairs showing loss of vowel or diphthong can be seen in *enəmi+ity*, here /ə/ is lost.

Addition of Phonemes

This type of morphophonemic change happens when one of two allomorphs of a morpheme lacks one or more phonemes which are present in the other. It is more convenient to consider that the longer one is normal and the other has lost one or more phonemic(s). Occasionally, however, the simpler description results from treating the shorter form as the normal one, to which a phoneme or phonemes is/are added to form the other allomorph. In the case 'idle', the bound form /aydl-/, as in *idler*, *idling*, can be called normal, and /ə / is added to it o make the free form /aydəl/. Another example is the normal form of 'solemn' is: /saləm/ to which /n/ is added before the derivational suffix /ayz/ to make /salmnayz/. More examples of an added consonant appear in the set /lohn/-/lohngər/, /lohngəst/ where /g/ appears before the inflectional suffixes (-er) or (est).

Simple Consonant Change

An alternative allomorph of morpheme could differ from the normal in showing a change of one or more consonants. Usually it is final consonant that is changed. The normal form of the stem 'mi' is /mit/, as in: *permit*, *committee*, etc. But before certain suffixes, the final /t/ changes to /s/, as in: *permissive*, *permissible*, etc. A common type of consonant change is voicing. Thus, when a voiceless consonant in the normal allomorph is replaced by its voiced counterpart, the process is called 'voicing'. We have already seen an example in the pair/pen-penz/, where the allomorph/pen/ of the plural form shows voicing of the final consonant. Sometimes, the reverse process of *unvoicing* occurs. The normal form of the plural suffix (-es) is /iz/, which loses its vowel after morpheme ending in voiced consonants except /z, j/, and after voiceless consonants except /s,c/ this is unvoiced to /-s/, as in: /ræts, kæps/, etc.

Assimilation

Assimilation is a phonemic change occurring when two morphemes are combined this results in neighboring phonemes becoming more like each other. Here, 'more like' means that the new phoneme shares more articulatory features (Sukarsono, 2009:6). Assimilation is a common explanation of consonant change in English. A common change due to assimilation is that of /n/ to /m/ before bilabial consonants. Thus the negative prefix (in-) has an allomorph /im-/ which occurs before /p,b/, as in: *impossible*, *imbalance*. Similarly, the prefix (en) has an allomorph /em-/, occurring before /p,b/ as in: *empower, embitter*, and the like. Phoneme /p/ is voiceless and a stop, while /m/ is voiced and nasal. Phonemes /p/ and /m/ are alike in one feature only, their bilabialness. On the other hand, /b/ is more like /m/ than /p/ is, because it shares with it two features, bilabialness and voicedness, rather than just one. The other definition is also conveyed by (Kelly, 2000:109) assimilation describes how sounds modify each other when they meet, usually across word boundaries, but within words too. If it is considered the words ***that*** and ***book***, and look at the phonemes involved, we get /ðæt/ and /bʊk/. If then we place the words into a sentence (for example, C*ould you pass me that book, please*? we notice that /t/ phoneme at the end of that does not sound like it does in the word said on its own. The phoneme /t/

is an alveolar sound, which is formed when the tongue blade forms a temporary closure against the alveolar ridge.

Dissimilation

Dissimilation occurs when the combining of two morphemes brings together two identical phonemes, it results in the change of one of them to a phoneme less like its neighbour. It is rare in English. One example, taken over from Latin, is the allomorph /ig-/, which replaces /in-/ before some morphemes beginning wit /n/, as in: *ignoble*, *ignominious*. Thus, 'dissimilation' is the opposite of 'assimilation'.

Synthesis

Synthesis is a consonant change commonly occurs in modern English. It is the fusion of consonants, brought together by morpheme combination, into a single new phoneme different from both of its constituents. The new phoneme must be considered to belong to both the allomorphs whose junction-point it represents. For example, when the morphemes (moist) and (ure) are combined, the result is not /'moystyər/ but /moyscər/.The /c/ here phonetically represents the synthesis into a single phoneme of /t/ and /y/. We thus analyze the word into the stem /moyse-/, an allomorph of (moist), and the suffix /-c ər/, an allomorph of (-ure). The phonemes /c/ belongs to them both. More examples are given below:

(1)   t-y > c   neyt   + yə r   >   neycər (nature)

      t-y > s   ækt   + yən   >   æksən (action)

      s-y > š   pres   + yər   >   presər (pressure)

      z-y > z   viz   + -yən   >   vizən (vision)

      s+y > z   prris   + -yən   >   prizən (prison)

      d+y > j   prowsiyd + yər   >   prowsiyjər (procedure)

Change of Syllabic Vowel or Diphthong

There is a type of morphophonemic change which is very prevalent in English. That is the substitution of another syllabic vowel or diphthong for the one which appears in the normal allomorph. The example is change of syllable in the past tense in pairs like /teyk – tuk/, /rayd – rɔ wd/, and /sty – səh/. Here, diphthong *ey*, *ay*, and *iy* respectively change into (syllabic) vowel u, ow, and o. Change of syllabic vowel happens in a small group of irregular noun plurals like /guws – giys/ and /mawa – mays/. But there are many other changes of syllabic nucleus that we are less conscious of, partly because the words in which they occur are less common, and partly because standard orthography often conceals changes that take place in the spoken language. Thus, the regular spelling of the pair nation-national conceals the change of syllabic form /ey/ to vowel / æ/, which is clearly revealed in the phonemic spelling /nesyən- næsənəl/. For more examples, see the list below:

(2) e > ow swell (*swell*) - swolən (*swollen*)

     ay > i   priysays (*price*) - priysizən (*prices*)

     iy > e   pliyz (*please*) - plezənt (*pleasant*)

     ih > ə   hihr (*hear*) - hərd (*heard*)

     ih > æ   klihr (*clear*) - klæritiy (*clearity*)

     ow > a glowb (*globe*) - glabuhl (*global*)

Stress Shift

Stress shift is a change of a stress occurring in the syllables of newly formed word due to the addition of an affix to a word in English. For instance, when the suffix (-ic) is added to 'despot', the primary stress moves from the first to the second syllable, giving us the pair /despat despatik/. The stress shift is commonly accompanied by vowel change. But there are some cases, without the accompanying of vowel change, as given in the following example:

(3)   i´mpals (*impulse*) - imp´alsiv (*impulsive*)

si´ntæks (*syntax*) - sint´æktik (*syntactic*)

li´ngwist (*linguist*) - ling´wistik (*linguistic*)

I´mport (*import*) - imp´ortənt (*important*)

Gradation

As previously discussed, the process of derivation involves stress shift and usually also involves certain types of vowel change. In this case, the other vowels and diphthongs tend to be replaced by /i/, /i/, or /ə/ when the stress shifts happen to another syllable, and vice versa. This kind of vowel change resulting from shift of stress is called *gradation.* There are two kinds of such change: 'the change of 'full' vowels and diphthongs to /i,r,ə/ to 'full' vowels or diphthongs when the stress shifts onto the syllable. These changes can be seen below:

(4) Instrument (*instrument*) - instrumentəl (*instrumental*) ə > e

mistəriy (*mistery*) - mistiriyəs (*misteries*)   ə > i

simbəl (*symbol*) - simbəlik (*symbolic*) ə > a

sig´ar (*sigar*) -   sigər´et (*sigaret*)   a > ə

insp´ayr (*inspire*) - Inspireysən (*inspiration*) ay>i

Məriỳn (*marine*) - mərinər (*mariner*) iy > i

Suppletion

Suppletion happens when an allomorph fits into a paradigm with another allomorph; the two belong to the same morpheme even though they may be phonemically completely different. We have already observed a case of suppletion in our discussion of the plural morpheme (-es). Consider the following group of words, illustrating part of the form-class of 'plural nouns'.

(5)   /meyziz/ (maizes) = (maze) + /-iz/

/dogz/ (dogs)   =   (dog) + /-z/

/raets/ (rats)   =   (rat) + /-s/

/aks n/ (oxen)   =   (ox) + /-n/

Here it is clear that the four suffixes /-iz, -z, -s, -n/ all occupy the same position in the paradigm. In other words, they are semantically similar and in complementary distribution. The first three exhibit some phonemic similarity. If we establish /-iz/ as the normal form, we can describe /-z/ as /-iz/ with loss of the vowel phoneme and unvoicing of the final consonants, but when we come to /-n/, all we can say is that it replaces the normal form /-iz/, to which it is phonemically very different. Such a case is suppletion. Another case of suppletion occurs in the past tense forms of verbs. Consider the following list:

(6) | **Base** | **Inflected Form** |
|---|---|
| Fret (*fret*) | fretid (*fretted*) |
| Reyd (*raid*) | reydid (*raided*) |
| Rab (*rob*) | rabd (*robbed*) |
| Wohk (*walk*) | wohkt (*walked*) |
| Teyk (*take*) | tuk (*took*) |
| Gow (*go*) | went (*went*) |

The inflection (-ed), has normal allomorphs /-id, -d,-t,/ as found in the first our examples above. In the pair /teyk-tuk/ (*take - took*) we have change of syllabic nucleus with addition of the zero allomorph of (-ed). On the contrary in the pair /gow-went/ (*go -went*), the form /wen-/, which is the best of the inflectional form, is phonemically completely different from the three form /gow/. This case is also called the phenomenon of suppletion.

From these explanations above it can be concluded that there are ten types in morphophonemic process that can be used to analyze the word formation.

Morphophonemic processes in Igbo language
Igbo language is a language spoken in the Eastern part of Nigeria. Igbo language belongs to the 'Kwa' group of languages. In Igbo, morphophonemic processes are evident in different aspects of the language. These processes refer to the changes of phoneme as a result of the merging of one morpheme to another. Some of the aspects of morphophonemic processes in the Igbo language are: *negative suffixation, vowel harmony*, *tone, tense*. These processes are explained below:

Negative suffixation
Negation is a process or construction in grammatical semantic analysis which typically expresses the contradiction of some or all of a sentence marching similarly (Crystal 2008: 323). Furthermore, Mgbemena (1982) defines negation as a grammatical process by which affirmative sentences are converted into negatives. In Igbo language, we have one negative marker **ghị** even though there has been contention on adding (ghi) in order to balance the rule of vowel harmony, whereby *ghị* follows light vowel group (a ị ọ ụ) and *ghi* follows heavy vowel group (e i o u). This morphological contention is valid because of phonological consideration. The selection of one of the two allomorphs of 'GHỊ' (ghi/ghị) is based on vowel harmony consideration of the verb root.
Formula:
(1) N i/-(e)
(2) N ị/-(a)

Examples 1:

  (a) Righi nri   'did not eat'

  (b) Beghi akwa   'did not cry'

  (ch) Zughi ohi   'did not steal'

  (d) Gboghi ọgụ   'did not separate fight'

  (e) Sighi nri   'did not cook'

  (f) Gbughi ọnwụ   'did not kill'

  (g) Kughi akupe   'did not fan'

  (gb) Zoghi ezo   'did not hide'

  (gh) Koghi eko   'did not rise'

  (gw) Kpeghi ekpere   'did not pray'

Examples 2:

  (a) Rụghị ọrụ   'did not work'

  (b) Rọghị nrọ   'did not dream'

  (ch) Rịghị elu   'did not climb'

  (d) Saghị akwa   'did not wash clothes'

  (e) Zaghị ụlọ   'did not sweep the house'

  (f) Rahụghị ụra   'did not sleep'

(g) Kụghị aka   'did not clap'

(gb) Gbaghị ọsọ   'did not run'

(gh) Chịghị ọchị   'did not laugh'

(gw) Gbaghị egwu   'did not dance'

Vowel harmony

"Vowel harmony is a phonological phenomenon whereby vowels divide themselves into sets in which members of one set almost never co- occur with members of the other set" (Mbah & Mbah 2000:81) as cited in Chukwu (2009). This phonological process is realized in Igbo language. The vowel harmony rule is highly obeyed in the language. In an Igbo word, the vowels that the word comprises of, has to belong to one group of vowels although there are few exceptions. Selecting vowels randomly from both groups will not result to an acceptable Igbo word. In this case, the phonological properties of words determine their possible combinations in the language.

Mbah & Mbah (2000), describe the two sets as pharyngealized and non- pharyngealized, with the schema 'V -ATR/-ATR' and 'V +ATR/+ATR'.

Examples:

Set A	Set B
-ATR (a ị ọ ụ)	+ATR (e i o u)
(a) Aká 'hand'	oké 'rat'
(b) Atọ́ 'three'	itè 'pot'
(ch) ọtụtụ 'many'	ébùbó 'allegation'
(d) Nkịta 'dog'	onugbu 'bitter leaf'
(e) ọkụkọ 'hen'	ugbene 'feather'
(f) ọka 'maize'	ewu 'goat'
(g) akụkọ 'story'	osisi 'stick'
(gb) akpị 'scorpion'	okwute 'rock'
(gh) atụrụ 'sheep	ekwe 'gong'
(gw) ụbụrụ 'brain'	eriri 'rope'

Tone

According to William (2009), tone is the use of different patterns of pitch to distinguish words. Furthermore, Eme, et al (2001) state that tone is firstly to give meaning to a lexical item and secondly to differentiate semantic items which may otherwise appear similar in forms. Igbo is a tone language, this implies that tone is distinctive in the language. Tone can bring about change in the meaning of words that are similar in forms.

*Examples***:**

(a)

Ísí   'head';

ísì   'smell'

ìsì   'blindness'

ísī   'to cook'

(b)

ákwá   'cry'

ákwà   'cloth'

àkwá   'egg'

àkwà   'bed/bridge'

(ch)
ígwè   'iron'

Ìgwè   'crowd'

Ígwē   'king'

Tense
Emenanjo (2015) explains tense as a grammaticalization of location of time in terms or past, present and future. Tense is derived from Latin tempus time via old French. It is marked by grammatical morphemes and used to describe or explain the correspondence between the concept of time and the way it is expressed in the grammar of human language. The different forms it takes are dependent on the segment at the end of the morpheme to which it attaches: the dependencies are described by morphophonological rules.
The behaviour of the English past tense ending "-ed" is similar: it can be pronounced: /t/ *hoped*, /d/ *bobbed*, and /ɪd/ *added*.
Igbo language marks its past tense with *(-rV)* whereby the (r) remains constant and the (Vvowel) changes depending on the vowel harmony of the word-ending morpheme.

Examples 1 (r/V+ATR):

	Present	Past	
(a)	gbu 'kill'	gburu	'killed'
(b)	ri 'eat'	riri	'ate'
(ch)	re 'sell'	rere	'sold'
(d)	lo 'swallow'	loro	'swallowed'
(e)	si 'cook'	siri	'cooked'
(f)	te 'rub'	tere	'rubbed'
(g)	zu 'steal'	zuru	'stole'
(gb)	ke 'tie'	kere	'tied'
(gh)	be 'cry'	bere	'cried'
(gw)	su 'pound'	suru	'pounded'

Examples 2 (r/V-ATR):

	Present	Past	
(a)	gbọ 'vomit'	gbọrọ	'vomited'
(b)	sụ 'wash'	sụrụ	'washed'
(ch)	sị 'say'	sịrị	'said'
(d)	za 'sweep'	zara	'swept'
(e)	gba 'run'	gbara	'ran'
(f)	ta 'chew'	tara	'chewed'
(g)	gba 'dance'	gbara	'danced'

(gb) ghọ 'pluck'   ghọrọ 'plucked'

(gh) ghụ 'pierce'   ghụrụ 'pierced'

(gw) tụ 'pinch'   tụrụ 'pinched'

From the data presented above, it evident that there are changes in the forms of words due to their environment of occurrence. This environment of occurrence is depicted in the phonological realizations of phonemes.

Conclusion

Morphophonemic processes are evident in Igbo language. The forms of words change at different environments of occurrence. This paper describes the morphophonemic processes of *negative prefixation*, *vowel harmony*, *tone*, and *tense*. The morphophonemic processes realized in Igbo language are identified and described, they are 'Negative prefixation', 'Vowel harmony', tone, and 'tense'. *Negative suffixation '-GHI'* which is realized as *(ghi/ghị)* is based on vowel harmony rule. *Vowel harmony* depicts the two groups of Igbo vowels *+ATR* and *-ATR*. Vowels are selected from one group or the other in forming Igbo words. Its either the selection comes group *+ATR* or it comes from group *-ATR* from one group or the other, selecting haphazardly will result to ungrammaticality and unacceptability. *Tone* is distinctive and can result to different meanings of forms that appear similar. The three operating tones in the language are *high (')*, *low (`)* and *down-step (-)*. *Tense* in Igbo is morphophonological, precisely the past tense *'rV'* marker obeys the vowel harmony rule. In an environment where the main verb is from +ATR group, the 'rV' follows the group and vice versa.
This paper has been able to present and show aspects of morphonology in the Igbo Language. These form changes of the 'morpheme' are observed to have been dependent on the sounds surrounding each morpheme in any word formation process Essentially, this relates to the correlation and/or interaction between morphemes and phonemes.

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