Phonological Analysis of Vowel Raising in Igbo

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Abstract

This study delves into the phonological analysis of vowel raising in Igbo. Vowel raising is a phonological phenomenon where the tongue height is elevated to a higher position in anticipation of articulating a subsequent high vowel. Despite the limited body of research on the phonological process of vowel raising in Igbo, this study aims to identify the Igbo vowels susceptible to raising, delineate the types of vowel raising present in Igbo, and elucidate the phonological environments in which vowel raising occurs in the Igbo language. Employing a descriptive research design, data were gathered through oral interviews utilizing a purposive sampling technique with 50 respondents. The study utilizes Generative Phonology for data analysis, adhering to the tone marking convention established by Green and Igwe (1963) and employing the International Phonetic Alphabet for data transcription. The study's findings disclose the presence of mid vowel raising in the Igbo language. Furthermore, it was observed that the open-mid front advanced vowel /e/ associated with the second verb root/stem elevates to four distinct tongue heights, namely: close front advanced unrounded vowel /i/, close-mid front retracted unrounded vowel /ɪ/, diphthong /ui/ amalgamating close back advanced rounded vowel /u/ and close front advanced unrounded vowel /i/, as well as the diphthong /ʊɪ/ combining close-mid retracted rounded vowel /ʊ/ and close-mid retracted unrounded vowel /ɪ/.

Keywords: Vowel, Vowel raising

1. Introduction

Vowel raising is a phonetic phenomenon characterized by the elevation of a vowel's tongue position compared to its original articulation. According to Ladefoged and Johnson (2014), this process involves a shift towards a higher articulatory placement, often influenced by phonetic factors or historical linguistic changes. Similarly, Hayes (2009) suggests that vowel raising can be influenced by phonological contexts, such as adjacent nasal consonants or systematic alterations in pronunciation. Vowel raising is a significant linguistic occurrence observed in various languages and dialects. This study delves into the different manifestations of vowel raising and the specific phonetic environments in which vowel raising occurs in Igbo.

2. Objectives of the study

The primary goal of this research is to delve into the phenomenon of vowel raising within the Igbo language. The specific objectives include identifying which vowels in Igbo are susceptible to raising, categorizing the various types of vowel raising present in Igbo, and elucidating the specific phonological environments in which vowel raising occurs within the language. To facilitate our investigation, we have formulated the following research inquiries:

Which specific vowels in the Igbo language are subject to raising?

1. What are the distinct categories of vowel raising observed in Igbo?
2. In what phonological contexts does the phenomenon of vowel raising manifest in Igbo?

3. Literature review

This section discusses vowel and vowel raising.

A vowel is a speech sound that is produced with an open oral cavity, characterized by the absence of contact between the tongue and the upper mouth or teeth, and the unobstructed flow of air. Vowels are articulated when there is no hindrance to the vocal cords. They are typically voiced.

As per O'Connor (1980:79), vowels are generated by voiced airflow passing through various mouth configurations; the variations in mouth shapes result from different tongue and lip positions. Ikegwuonu (2022:27) defines vowels as speech sounds produced without any vocal tract obstruction. When vowels are articulated, the articulators maintain a certain distance to allow the air to flow freely without significant friction. In Igbo, there are eight phonemic vowel sounds: /a e i ɪ o ɔ u ʊ/, corresponding to the letters [a e i ị o ọ u ụ] respectively. Each vowel sound is represented by a single letter in the orthography, unlike English where a vowel sound can have multiple orthographic representations. Additionally, vowels are voiced sounds and serve as Tone Bearing Units (TBU). The mutable features of vowels include frontness, height, roundness, and tenseness, influenced by neighboring consonants which can lead to vowel raising.

Vowel raising is a phonological phenomenon where a vowel is elevated or raised, indicating a higher position of the tongue closer to the roof of the mouth. Conversely, lowering refers to the opposite effect. Podile (2002:65) describes vowel raising as a process where the tongue height is heightened to prepare for the articulation of a subsequent high vowel. Crystal (2003:386) explains that raising is a vertical process affecting tongue height, contrasting with lowering, and occurs when a vowel is raised in anticipation of a following high vowel. Over time, languages may witness vowels originally in a low position moving to a higher location in the mouth. Trask (2006:300) defines raising as any phonological process that elevates a vowel to a higher mouth position. Dailey-O'Cain (1997) characterizes vowel raising or tensing as the realization of mid or low lax vowels at a higher and tenser position. Vowel raising manifests in various forms depending on the language being studied.

4.1 Mid vowel raising

Citing the Basque (language isolate: Spain and France, Hualde, 1991) provides an example of vowel raising. Exemplified here from the Baztan dialect, low vowels raise to mid when following high vowels.

Basque raising

1. absolutive singular		**absolutive plural**		
a. /gogo-a/	gogoa	/gogo-ak/	gogoak	'wish'
b. /buru-a/	burue	/buru-ak/	buruek	'head'

The conditions for raising differ from language to language. For example, Gunu (Bantu, Niger-Congo; Cameroon. Hyman (2001) raises low vowels to mid, as does Basque, but exhibits raising after both high and mid vowels. Consider the illustration in (1) the suffix in (1a) [a], with (1b) illustrating the mid [e] that occurs after high and mid advanced vowels.

2. Gunu raising

a. fem- a ‘hate’

fon - a ‘bless’

lab - a ‘profit from’

b. bid - e ‘interrogate’

fug - e ‘mix’

déb - e ‘ flow’

Basque assimilates a low vowel to a high vowel, while Gunu assimilates a low vowel to high and mid advanced vowels. This highlights the need to categorize high vowels separately in some languages and high/mid vowels separately in others. Mid vowels in Doke and Mofokeng (1974) transform /ɛ/ to /e/ and /ɔ/ to /o/ near close vowels or consonants with hidden close vowel traits. These transformations occur recursively in words, constrained by predicting the raising syllable. Mid vowel raising occurs in languages like Sesotho, English, Makonde, and Vulgar Latin. The Great Vowel Shift involves raising the long mid-front vowel [e:] to [i:], seen in words like green, meat, tree. In Vulgar Latin, vowels were elevated under the influence of a neighboring [j] with high tongue position. This phonetic change is a form of metaphony, approximating one vowel's quality to another. The impact of [j] on vowels varied depending on context duration.

4.2 High vowel raising

Kera (Chadic, Afroasiatic, Chad) exhibits vowel raising (Pearse, 2003). As seen in verbs and nouns with person suffixes, high vowels are dominant, in that a high vowel anywhere in a phonological word causes a non-high vowel to raise.

Kera raising

3.root- a (3 FEM SG)	**- i (2 FEM SG)**	**-u (3 MASC)**	
‘her X; X her’	**‘your(FEM) X;X you’**	**‘his X; X him’**	
a. /i/ /gi:d/ gi:d+	/gi:di/	gi:du	‘stomach’
/+/ /tʃ+˙ (r)-/ tʃ+˙:r+	/tʃi:ri/	tʃu:ru	‘head’
/u/ /gun-/ gun+˙	/guni/	guni	‘wake’
b. / e/ /sɛ:n-/ sɛ:na	/si:ni/	si:ni	‘brother’
/a/ ka:s-/ ka:sa	/k+˙:si/	k+:s	‘hand’
/ɔ/ /gɔld-/ gɔlda	/gulduj/	guldu	‘search’.

Raising can apply to an affix, for example, the suffix /-a/ (3 Fem SG) surfaces as low when the root vowel is non-high (3b) but raises to high when the root vowel is high (3a). Root vowels too may change, for example, the roots in (3a) are underlying high and surface as such when occurring with a suffix that also has a high vowel; but when a high suffix appears with a non-high root, as in (3b), the root vowel raises to high.

Note crucially that vowels only raise by a single step in such a system; a low vowel raises to [e], but such a derived mid vowel does not undergo further raising to [i].

Kulikov (2010) in his study on voicing and vowel raising in Sundanese asserts that f1 and f3 of non - high vowels [ɛ, ə, ɔ, a] change significantly after voiced stops. Voiced stops systematically cause raising and fronting of these vowels. His results show that the laryngeal contrast in Sundanese has redundant phonetic properties, which may indicate an ongoing language change or influence from a neighboring language (Javanese). He goes on to say that Sundanese has seven contrastive vowels /i/, /ɛ/, /a/, /ɨ/, /ə/, /ɔ/, and /u/. Acoustic observation suggests that non-high vowels /a/, /ə/, /ɛ/, /ɔ/, undergo raising and fronting after voiced stops, while high vowels /i/, /ɨ/ and /u/ are not affected by voicing in the preceding consonant.

Adamako (2012) examines vowel raising in reduplication in Akan, a Niger-Congo (Kwa) language, focusing on the Asante-Twi dialect. He observes that in Akan, in reduplicating, CV stems, the stem [+low] vowels are pre-specified with [+high] the reduplicant (RED). However, it has been claimed that raising to the mid vowel in disyllabic REDs is idiosyncratic to the Fante dialect. This phenomenon he attests in Asante and that stem $CV_1 V_2$ where V_2 is [+low], raises to a corresponding [-high,-low] vowel in the RED, and not [+high].

In Cameroon, Ngessimo and Chie (2006) investigate the phonological change of vowel raising in Babanki, a grass field Bantu language of North-western Cameroon. They discover the manifestation of vowel raising, where the front and back vowels /a/ and /o/ alternate with /o/ and /u/ respectively in associative and possessive constructions, just in case they are part of the sequence [vŋ] (where v stands for vowel). Example:

4. Nouns

m̀bàg	‘walking stick’	mbòghòm	‘my walking stick’
ntay	‘rope’	ǹtòwu	‘your rope’

Mbah and Okeke (2014) in their paper on vowel raising in Nkpor dialect of Igbo, adopting the Generative phonology, lay three main claims. First, the voiced palatal nasal /ɲ/ is elided in the course of the vowel raising. They claim that in a word consisting of two root verbs, the initial verb root contains any consonant and any vowel, and the second verb root contains the voiced palatal nasal /ɲ/ and a mid-vowel /e/ of the second verb is raised to a high front vowel /i/ or /ɪ/ agreeing with the vowel harmony rule. Third, the Nkpor dialect goes beyond the raising of only vowels of the second verb. It further raises vowels of the first verb which are not high. The much more rapid loss of the voiced palatal nasal /ɲ/ and the consequent raising of the vowels are plausibly attributed to rapid speech, especially in construction and some sociolinguistic factors.

5. Methodology

This study used descriptive research design and purposive sampling to select 50 Igbo respondents of varying ages out of the population of the entire Igbo indigenes resident in Ukwulu

community of Igbo. They were categorized into different age groups for interviews. Verbal responses were recorded, transcribed, and analyzed using generative phonology theory. Data were transcribed using IPA symbols and tone markings. English gloss was provided for each word.

6. Data analysis

6.1 The Igbo vowels that can be raised

From the responses, it was found that only the open-mid front advanced vowel /e/ is raised to other vowels like high vowels /i/, /ɪ/, diphthongs /ui/ and /ʊɪ/. Diphthong /ui/ combines /u/ and /ɪ/, while /ʊɪ/ combines /ʊ/ and /ɪ/. Therefore, in Igbo, /e/ raises to [i, ɪ, ui, ʊɪ].

6.2 Kinds of vowel raising in Igbo

Open-mid front advanced vowel raising is the key vowel raising in Igbo. Mid-vowel is a class of vowel sounds in some languages. Mid-vowel tongue position is midway between open and close vowels. In Igbo, /e/ is used before /ɲ/ in 'nye' (give). 'nye' can be combined with (CV) root. This process involves elision of /ɲ/ and raising of /e/.

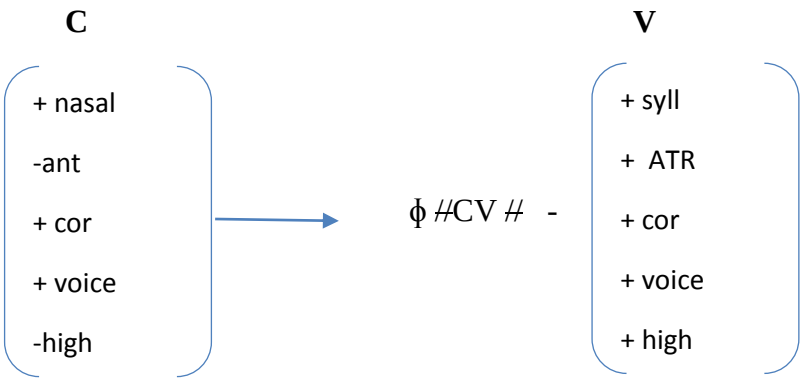
6.3 The phonological contexts in which vowel raising takes place in Igbo

The data analyzed below show that vowel raising is a feature of connected / rapid speech. In Igbo, vowel raising must involve the phonological process of elision. It is obtainable when the suffix which is a combination of the voiced palatal nasal /ɲ/ and the open-mid front advanced vowel /e/ are elided in rapid speech and substituted with other vowel sounds as can be seen in the examples below:

/ɲe/ → [i]

5.	**Slow speech**			**Connected speech**	**Gloss**	
i.	sì	+	nye	→	[sìi]	cook something
	cook	+	give			
ii.	tì	+	nye	→	[tìi]	put in
	put	+	give			
iii.	kè	+	nye	→	[kìi]	share with
	share	+	give			
iv.	kwù	+	nye	→	[kʷìi]	speak into
	talk	+	give			
v.	gò	+	nye	→	[gìi]	buy for
	buy	+	give			

Deletion rule

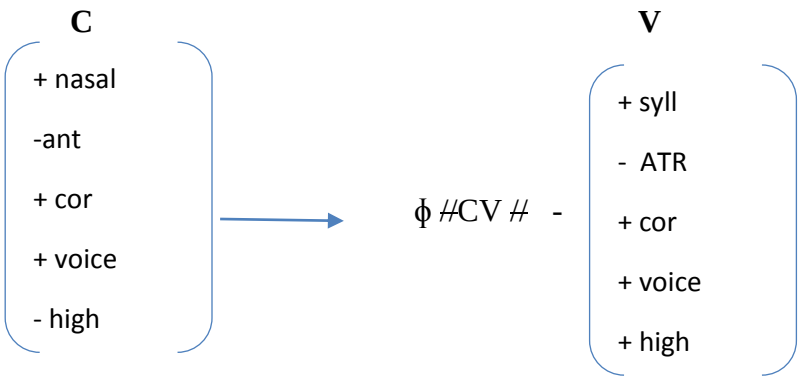


In example (5) i-v, the phonological rule elides /ɲ/ and raises /e/ to /i/. This vowel raising follows vowel harmony. First verb roots determine resultant vowel's harmonic set. Vowels [i, e, u, o] in (5) i-v are all advanced vowels. Resultant vowel is /i/.

6. /ɲe/ → [ɪ]

	Slow speech		Connected speech	Gloss
i.	wụ̀ +	nye →	[wìɪ]	pour in
	pour +	give		
ii.	fà +	nye →	[fìɪ]	force into
	force +	give		
iii	rà +	nye →	[rìɪ]	lure in
	lure +	give		
iv.	ghà +	nye →	[ɣìɪ]	put in
	put +	give		

Deletion rule



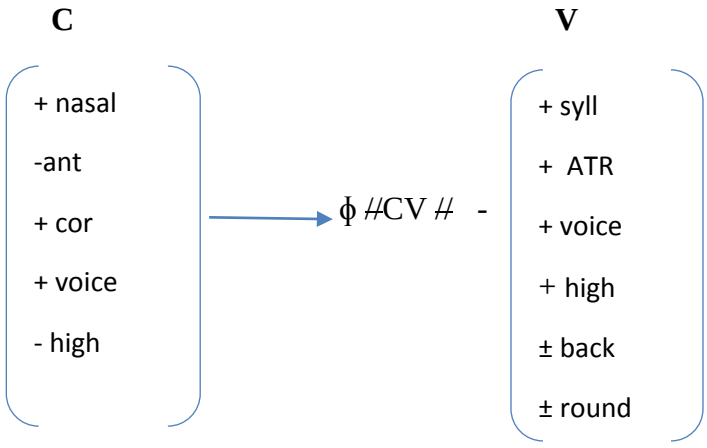
In example (6) i-v also, the vowels of the first verb roots are all retracted vowels (-ATR). These retracted vowels [a, ị, and ụ] which are in accordance with the vowel harmony rule, determine the harmonic set of the vowel raised to by the vowel of the second verb root /e/ after the elision of the voiced palatal nasal /ɲ/. The phonological rule shown above is evident to it.

7. /ɲe/ → [ui]

	Slow speech			**Connected speech**	**Gloss**
i.	bù	+	nye →	[bùi]	carry it to
	carry	+	give		
ii.	sò	+	nye →	[sὺi]	follow suit
	follow	+	give		
iii.	kù	+	nye →	[kùi]	dish out
	dish	+	give		
iv.	chù	+	nye →	[tʃὺi]	fetch in
	fetch	+	give		
v.	gbù	+	nye →	[ɓùi]	cut in
	cut	+	give		

In accordance with the vowel harmony rule, the open-mid front advanced vowel /e/ raised to a diphthong which is a combination of the two vowels: a close-back rounded advanced vowel /u/ and the close-front unrounded advanced vowel /i/, with the deletion of its counterpart, the voiced palatal nasal /ɲ/.Also, the resultant vowel is in the same harmonic set as the vowels of the first verb root. This is formalized below:

Deletion rule



8. **./ɲe/** → **[ʊi]**

i. dọ̀ + nye → [dʊ̀ɪ] carry in

carry + give

ii. kpọ̀ + nye → [ɓʊ̀ɪ] call in

call + give

iii. kpụ̀ + nye → [ɓʊ̀ɪ] mould in

mould + give

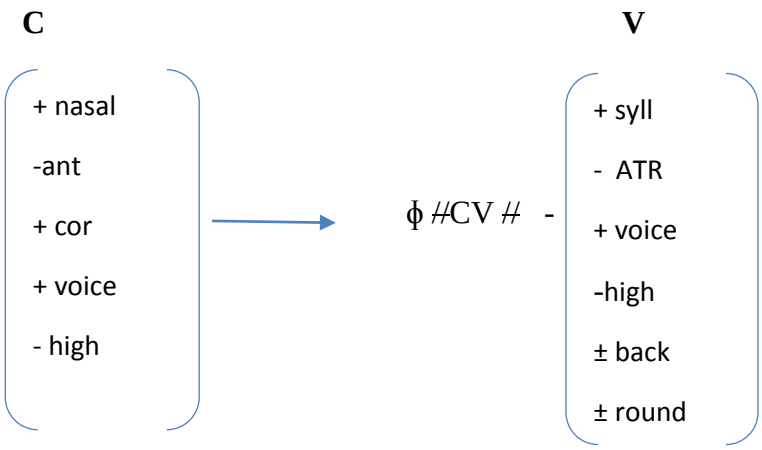
iv. gụ̀ + nye → [gʊ̀ɪ] count in

count + give

v. kụ̀ + nye → [kʊ̀ɪ] plant in

plant + give

Deletion rule



Also, in accordance with the vowel harmony rule, the open-mid front advanced vowel /e/ raised to a diphthong which is a combination of the two vowels: close-mid back rounded advanced vowel /ʊ/ and the close-mid front unrounded advanced vowel /ɪ/, with the deletion of its counterpart, the voiced palatal nasal /ɲ/. The resultant vowel also is in consonance with the vowels of the first verb root which belong to the [-ATR].

Conclusion and Recommendations

This research examines vowel raising in Igbo. Open-mid front advanced vowel /e/ elevates to four distinct tongue heights: 1. /i/, 2. /ɪ/, 3. /ui/ (comprising /u/ and /i/), and 4. /ʊɪ/ (comprising /ʊ/ and /ɪ/). Vowel raising results from vowel interaction in compound words with two verb roots. Adult and elderly Igbo individuals consistently exhibit vowel raising, while the younger generation shows a decline. Scholars should explore vowel lowering in Igbo and other languages.

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