

# The Diphthongs of Formal Nigerian English: A Preliminary Acoustic Analysis

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## Abstract

Postcolonial varieties of English, used in countries such as Nigeria, India and Singapore, are subject to both local ("endonormative") and external ("exonormative") forces, the latter often in the form of British/American English. This gives rise to a stylistic continuum, where informal speech is more endonormatively oriented than formal/educated speech, which, nevertheless, is clearly distinguishable from British/American English. The formal end of the continuum is often regarded as the incipient local standard.

Nigerian English (NigE) is the most widely spoken African variety of English, but empirical/quantitative descriptions are rare. In this pilot study, we present an acoustic analysis of eight phonological diphthongs produced in formal contexts by nine educated speakers of NigE with L1 Yoruba and drawn from the ICE Nigeria corpus.

Results show that the NigE speakers produced more monophthongal realisations of English phonological diphthongs than speakers of British English (BrE) do, as measured by trajectory length in F1-F2 space. Phonetically, most of these vowels can be considered monophthongs.

The results can be explained through two factors at work during the foundation phase of NigE: (1) historical L1 influence and (2) the native English input present in the country, which involved more monophthongal realisations of some phonological diphthongs than in present-day BrE.

**Index Terms**: Nigerian English, diphthongs, monophthongisation, Yoruba, postcolonial varieties of English, New Englishes

## 1. Introduction

#### 1.1. Nigerian English and its history

Nigerian English (NigE) is a postcolonial variety of English (also known as World Englishes) spoken by approximately 20% of the population (or 37 million Nigerians at 2016 population levels), a number that is rapidly increasing [1-3]. Created during the era of British colonial expansion, Nigeria is the most populous anglophone country in Africa [4]. English performs functions of both an official and a national language, although its status is not formally codified [5].

Historically, English was introduced to Nigeria by British traders, who started to arrive at the West African Coast in the sixteenth century [4]. The contact language emerging from this exchange was a mixture of English words and West African syntax, a likely predecessor of Nigerian Pidgin English. After the British assumed formal control in the South in the 19th century, the colonial administration initially saw no need for teaching locals their language, a

development mirrored in other colonies. In Nigeria, Nigerian Pidgin English was considered sufficient for communication between the colonisers and the colonised [6]. The formal variety of English used in Nigeria today can be traced back to the influx of English-speaking Christian missionaries from 1842 onwards [7].

With Nigerian independence, the English language became a quasi-official language, although it is not mentioned as such in the constitution or any governmental statute or decree [5]. Today, English is the language of commerce and business, government and law as well as education and the media. As Nigeria is a multilingual country, English is also widely used as a lingua franca [4].

## 1.2. The norm orientation of Nigerian English

Historically, NigE relied on British norms, which even today are promoted in schools and universities. Received Pronunciation (RP) is encouraged as a model at the level of phonology, and British English (BrE) is accepted as the standard by the examining bodies in Nigeria [8]. However, due to contact with indigenous languages, mode of transmission (English is mainly learned in the classroom), cultural contact, its sociolinguistic functions, and the influence of non-Standard BrE, the variety of English used in Nigeria today differs noticeably from BrE and has been subject to a process of indigenisation [9]. During indigenisation, a common process for postcolonial varieties of English, local ("endonormative") and external ("exonormative") forces compete, the latter often in the form of BrE and, more recently and more rarely, American English [10]. There is no uniform accent of English, and there is as yet no fully codified and accepted Standard NigE [7]. NigE, like most other postcolonial varieties of English, is not homogeneous and can vary depending on formality and a speaker's first language (L1).

Table 1: Pronunciation variants of the diphthongs of NigEin previous research, variants in the second column orderedby prevalence.

Lexical Set	NigE	BrE	Ref.	
FACE	e, e:, a, ei	eı	[4, 21, 22, 13, 30]	
GOAT	0, 9, 0u, 90	ວບ	[4, 5, 30, 21, 19]	
CURE	ua, uwa, u, ɔ, ɔa	ບຈ	[4, 5, 21]	
PRICE	ai, a, i, a	aı	[4, 21, 22, 5]	
Mouth	au, ao, a	au	[4, 21]	
NEAR	ia, ija	IƏ	[4, 5, 21]	
SQUARE	ia, ija, iɛ, eɛ, ea	сз	[4, 5, 21]	
CHOICE	oi, oi	ЭI	[4, 5, 21, 22]	

Formal or educated NigE is of particular interest because it is likely to form the basis of the emerging local standard [11], and it is for this reason that the present study focuses on this subvariety.

Since its arrival in Nigeria, the English language has been in constant contact with the more than 500 languages spoken in Nigeria [4]. Since English is a second language for most Nigerians, this language contact may give rise to sociolinguistic variation emerging from a speaker's L1. The three most widely spoken languages are Hausa, Yoruba, and Igbo [1].

Although systematic studies on the acceptability and attitudes towards subvarieties of NigE are lacking, Yoruba English is thought to have been particularly influential due to the position and influence of Lagos, the largest Nigerian city [12]. Today, some researchers believe that the Yoruba English accent may become the standard accent [13].

### 2. Previous Research

In empirical investigations, formal NigE has been shown to differ from BrE on various dimensions, such as in the use of the progressive [7, 14], the present perfect [15, 16], the subjunctive [17], and pragmatic particles [18]. However, to date most analyses have not relied on empirical data, with the exception of surveys. There are several notable book-length publications on NigE [1, 5, 19]. In particular, phonological [12, 13, 20-22], syntactic [9], lexical [23-26], and morphological [9] aspects have been studied. Overall, previous research demonstrates that differences between BrE and NigE are greater in spoken than in written language [14, 16, 18, 26, 27], as is often the case for postcolonial and other varieties.

A considerable number of studies has also been conducted on NigE phonology [5, 19, 20, 22, 28]. The vast majority of the available evidence is impressionistic and rarely differentiates between ethnic groups and there is no acoustic evidence on vowel quality. The two exceptions we are aware of are a study on fluency, indicating the NigE speakers articulate more slowly than L1 speakers but adhere to similar phonological constraints governing fluency [27] and one on speech rhythm and vowel reduction [28]. The latter study provided evidence that vowels in function words are not reduced to the same degree in NigE as they are in BrE (and in our analysis we will consider diphthongs in function and content words separately).

Descriptive studies suggest that several vowels that are, phonologically, diphthongs are monophthongised in NigE. Table 1 summarises the pronunciation variants documented in the literature, using the lexical sets notation [29]. For example, the FACE lexical set includes vowels that have the /er/ vowel in BrE. Not all phonological diphthongs are thought to have undergone monophthongisation to the same degree. For example, /er/ and /av/ are thought to be frequently realised as monophthongs, while we found no such claims for /ta/ and /ɛa/.

In summary, while there are strong indications that several NigE diphthongs have a tendency towards monophthongisation, views differ as to how exactly some of them are realised. Furthermore, due to the lack of empirical data, these observations are impressionistic and require verification [20].

This pilot study makes a first attempt to fill this gap. We provide an acoustic analysis of English diphthongs in

formal/educated NigE as used by speakers of Yoruba. As discussed in section 1, formal NigE is of particular interest because it is likely to form the basis of future standardisation efforts. Moreover, Yoruba-influenced variants of NigE are thought to have been historically influential in the development of the whole variety. Our analysis is based on data collected for a corpus of NigE and all recordings were made during occasions that were not specifically arranged for the data collection, such as public discussions. We thus claim ecological validity for the present analysis, given that speakers were minimally disturbed by the collection of the data.

## **3.** Aim

The aim of this pilot study is to determine in how far the diphthongs of formal NigE are monophthongised. As a default hypothesis, we assume that degree/frequency of monophthongisation follows the claims in the descriptive literature: **H1:** The degree of monophthongisation follows approximately the order mentioned in Table 1.

We consider function and content words separately, given that the former have been shown to be somewhat more centralised/reduced in NigE compared to content words [28], although not to the same extent as in BrE. This suggested the following hypothesis:

H2: Diphthongs in function words are centralised and have a shorter glide/trajectory length relative to content words.

## 4. Methodology

#### 4.1. Data

The material for this study was drawn from the Nigerian component of the International Corpus of English [31]. Overall, recordings of nine speakers with L1 Yoruba were analysed. The speakers were selected based on their first language (Yoruba), age (32-70, one unknown), gender (male), and level of education (university degree).

As it is our aim to focus on formal NigE, we chose speakers with a university degree, who can thus be considered representative of educated NigE. Moreover, the speakers and corpus files were chosen in order to favour mostly formal contexts and those with limited or no noise in order to ensure the reliability of the acoustic analysis. The text categories used for the analysis are unscripted speeches, broadcast discussions, broadcast news, non-broadcast talks, broadcast interviews, class lessons, and phone calls. These categories are formal, not scripted and can be regarded as spontaneous.

Men are vastly overrepresented in public life in Nigeria, which is reflected in the limited number of female speakers in the formal sections of the corpus. This prompted the need to restrict the analysis to male speakers.

#### 4.2. Analysis

A total of 1,253 tokens of eight phonological diphthongs occurring in stressed positions were analysed (/ei/, /əʊ/, /au/, /ai/, /uə/, /uə/, /iə/, /ɛə/). The number of tokens for each diphthong varies, with /ei/ (400 tokens) and /ai/ (308) occurring much more often than /ɔi/ (31) and /uə/ (41).

After applying forced alignment to the recordings [32], the boundaries were corrected manually in Praat [33]. In order to measure vowel height and backness as well as the vowel trajectory, the first and second formants (F1, F2) were measured automatically at 20% and 80% of vowel duration, using a Praat script written for that purpose. Content and function words were classified manually. Further, to eliminate physiological inter-individual differences, the results were normalised with the help of NORM, using Lobanov's vowelextrinsic normalisation method [34].

## 5. Results

#### 5.1 Vowel Onset and Trajectory

Overall, the results reveal the expected degree of monophthongisation in NigE. Fig. 1 shows mean vowel trajectories/glides for both function and content words, Fig. 2 for content and Fig. 3 for function words only. Table 2 shows median trajectory length based on Euclidean distance for content and function words and the difference between the word types (' $\Delta$  CNT-FCT'; positive values indicate longer trajectories in content than in function words).



Figure 1: Mean vowel trajectories in content (-c) and function words (-f).



Diphthongs in content words, group means

Figure 2: Mean vowel trajectories in content words.

Diphthongs in function words, group means



Figure 3: Mean vowel trajectories in function words.

Table 2: Median trajectory length of diphthongs (M) and
standard deviation (SD) in content and function words and
difference between medians.

Lexical Set	Ν	Content		Function		Diff.
		<u>M</u>	<u>SD</u>	M	<u>SD</u>	$\Delta \text{CNT-FCT}$
FACE	400	0.48	0.67	0.95	1.01	-0.48
GOAT	234	0.68	0.84	0.49	0.54	0.18
CURE	41	0.57	0.68	0.78	0.51	-0.20
PRICE	308	1.44	0.82	1.42	0.91	0.02
Mouth	137	0.93	0.69	0.93	0.64	0.00
NEAR	45	1.21	1.15	1.40	0.84	-0.20
SQUARE	57	0.89	0.68	0.84	0.65	0.06
CHOICE	31	1.31	0.88			

FACE: In content words, /et/ is somewhat more central than in RP and starts at a close position (/e/), with a very short glide towards /i/. However, in function words /et/ has a much longer glide; it is more front and close and moves in the opposite direction, towards /5/.

GOAT: In both content and function words, /30/ is much more back than in RP (close to /0/), with an almost negligible glide.

CURE: This vowel is relatively central in NigE, with a very short glide that starts at central-back and close/close-mid position and moves in the direction of /a/ whereas in RP it moves to /ə/. The realisation in function words differs slightly in terms of onset (more front) and trajectory (backing).

MOUTH: The glide of |au| in content words starts at nearback position between open and open-mid and moves in the direction of |u|. In function words, |au| is slightly more close and back; the glide moves in the same direction. In RP the starting-point is central and the glide moves towards |u| [29]. PRICE: This vowel starts at central and open position, with a glide towards /i/ while in RP it moves to /i/ [29]. In function words, /ai/ is somewhat more central than in content words.

CHOICE: Data for /5i/ is available for content words only, where the onset is at close-mid position close to /5/ with a glide towards /i/.

NEAR: The starting-point of /19/ in content words is close and front, with a glide towards /a/ while in RP the movement is towards /9/ [29]. However, in function words /19/ is noticeably more front, with the glide also moving towards /a/.

SQUARE:  $\epsilon_{\vartheta}$  resembles  $\epsilon_{\vartheta}$  in its trajectory. The main differences between these diphthongs in our data appear to be that the onset of  $\epsilon_{\vartheta}$  is more open, and the trajectory shorter, with an offset position similar to  $\epsilon_{\vartheta}$ . We observed no differences between content and function words in the realisation of  $\epsilon_{\vartheta}$ .

In summary, several diphthongs that involve a substantial glide in BrE have negligible or much shorter glides in formal NigE (see Table 2). This is the case particularly for the /əʊ/ and /ei/ vowels, but also for /ʋə/, and to a more limited extent for /aʊ/. /ai/ and /ɔi/ have very long trajectories similar to those found in BrE [35]. The /ɛə/ diphthong is notable for its glide being very similar to that of /iə/, unlike in BrE.

#### 5.2 Trajectory Length in Function and Content Words

There appears to be no trend for function words to have shorter glides than content words, as shown in Table 2 (' $\Delta$  CNT-FCT'; positive values indicate longer trajectories in content than in function words). In fact, some vowels tend to have longer glides in function words.

Moreover, we did not observe a clear tendency for the onset or whole trajectory to be more centralised for function words. For example, /10/ is more front in function than in content words and /a0/ is slightly more back.

## 6. Discussion

Based on an acoustic analysis, this paper investigated the realisation of English diphthongs in formal/educated NigE as spoken by L1 Yoruba speakers. The results reveal that educated speakers of NigE produce more monophthongal realisations than in BrE of several but not all diphthongs, confirming our hypothesis.

As Figure 1 demonstrates, the diphthong /et/ is generally produced with a short glide in content words, and thus is almost monophthongised to [e], confirming previous impressionistic claims [5, 13, 20-22, 30]. However, in function words, the diphthong is clearly distinguished by its diphthongal quality. All these tokens come from the pronoun *they*, so that lexical effects might explain this unexpected result.

Just as the /et/ vowel, /30/ is generally realised with a negligible glide and is produced by the speakers analysed here as [0]. This result, too, confirms previous impressionistic claims [4, 5, 21, 30].

The diphthong / $\upsilon$ / is generally realised as [ $\upsilon$ ] with a very short lowering glide, not as [ $\upsilon$ a] as previous research indicates [4, 5]. The glide of / $\upsilon$ p/ in function words is more front.

As in the  $/\upsilon_{\theta}/$  diphthong, the trajectory of  $/a\omega/$  is shorter than in BrE and it is generally realised as [ao]. Monophthongisation to [a] was also observed only in a few

instances. Overall, the results are in line with previous comments [20, 21].

Similar to the findings of [4, 21, 22], the diphthong /ai/ is generally pronounced as [ai], with a longer second element in content words and as [ai] in function words. By contrast, monophthongisation to [i] as suggested by [5] was not found.

The /oi/ diphthong is realised as [oi] or [oi]. Realisation with a longer second element [i] was also observed, but no cases of monophthongisation were detected. These findings also substantiate previous claims [4, 5, 21, 22].

The centring diphthongs /1ə/ and / $\epsilon$ ə/ are not produced with monophthongal realisations. Furthermore, in formal/educated NigE, the diphthongs do not appear to be merged. The onset of / $\epsilon$ ə/ is more close than in BrE; the realisation of content and function words does not differ substantially. / $\epsilon$ ə/ is generally realised as [ea]. /1ə/ is realised as [ia]; however, content words are produced with a significantly more front realisation. The findings confirm some of the previous studies [4, 5, 13, 21, 22].

Overall, the results of this preliminary acoustic analysis indicate that in formal/educated NigE, two phonological diphthongs are realised as monophthongs. By contrast, /ɔi/ and the two centring diphthongs /iə/ and /ɛə/ are realised as diphthongs. Thus, our findings substantiate the claims of the impressionistic literature, confirming hypothesis H1. The realisation of function words proved to be distinct from the realisation of content words; however, the trajectories in function words are not consistently shorter and sometimes even longer than in content words, which contradicts initial expectations (our hypothesis H2) that function words are reduced in this respect.

#### 7. Conclusion

The preliminary acoustic results presented in this paper suggest that the diphthongs /ei/ and / $\vartheta$ o/ have a tendency towards monophthongisation and three closing diphthongs appear to remain invariable. Overall, the results confirm previous impressionistic studies.

The overall findings can be explained by (historical or contemporary) L1 influence and the historical influence of non-Standard British English. Specifically, Yoruba has only four diphthongs, *ei*, *oi* and *oi*, *ai*; the equivalents of *oi* and *ai* (the CHOICE and PRICE lexical sets) showed the longest vowel trajectories in our data [36]. Moreover, Nigerians were historically exposed to non-Standard varieties of BrE alongside Standard BrE [9]. Some of the former (e.g. those spoken in Scotland, Ireland and the North of England) show monophthongal realisations of /ei/ (FACE) and /ou/ (GOAT). These two vowels are among those with the shortest trajectories in our data [37].

Further analysis should focus on other subvarieties of NigE, contributing to a more comprehensive picture of the realisation of NigE diphthongs. In future research, we will investigate another group of NigE speakers with L1 Igbo. Preliminary results indicate that (1) this group shares a tendency to monophthongise some phonological diphthongs, but (2) that there is also a limited number of differences between the realisation of diphthongs by L1 Yoruba and L1 Igbo speakers. Future research should attempt to broaden our analysis of NigE phonology on the basis of a more varied sample in terms of gender and educational background.

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