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**A Descriptive Analysis of Consonant Cluster Production of English Words by
Selected Undergraduate Yoruba/English Bilinguals**

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ABSTRACT

This study examines patterns of consonant cluster production of English words by selected Undergraduate Yoruba English Bilinguals (UYEB). It also identifies phonological processes such as deletion and epenthesis in respondents' pronunciation and compared subjects' renditions with standard British English which is the target in English as a second language (ESL) in Nigeria. These were done with a view to assessing the implications of their renditions for communication in English as a Second Language (ESL) environment. Sixty undergraduate students were purposively selected from the three levels of higher institutions of learning; College of Education, Polytechnic and University. The respondents were required to read-aloud 50 dictionary-sourced consonant-clustered English words and a passage containing a large number of these words for collaborative validation. In addition to that, there was a questionnaire drawn to elicit information from participants on their personal data. The data of this study was transcribed and analyzed using WASP version 1.5 and theoretical insights were drawn from Optimality Theory (OT) of Prince and Smolensky. The findings reveal that Undergraduate Yoruba English Bilinguals (UYEB) did not realize native-like clusters. There were varieties in their cluster rendition. The research concludes that not all L1-L2 transfer are negative transfer, Also the difficulty encountered by respondents was a result of markedness in most cases which was accounted for using (Optimality Theory) OT.

Key words: Consonant clusters, Yoruba Bilinguals, Optimality theory, Markedness

1. Introduction

The English language has remained the official language in Nigeria till the present day. With about 527 indigenous languages (514 living languages, 2 second languages without mother tongue speakers and 11 with no known speakers, (Lewis, 2009) in Nigeria, the English language is highly essential for unification and this fact contributes to its thriving even in the face of promotion of the indigenous languages. As a global language, it is the language of technology and therefore useful in disseminating information in various ways.

The globalization and popularity of English language was a product of post colonization which was rooted in the craving for political and economic power by Britain and the US (the Inner Circle speakers of the Language) between 16th and 19th centuries. The defeat of Britain and the industrial revolution coupled with

the rate of technological advancement, all encompassing in western culture has influenced the globe without exemption to Nigeria. Language and culture are interwoven; the spread of one naturally leads to the spread of the other.

The rising purpose for English language culminated in its ever-increasing number of users to about 800,000,000 'by a conservative estimate and 1,500,000,000 by a liberal estimate', Crystal (1992:121). An analysis was given as about 400 million L1 speakers, about 400 million L2 speakers and about 600million foreign speakers. Those who use it as official language use it with their local languages; and while their local languages are used for unofficial communications (most of the time), English language is employed for official purposes. In this case, speakers tend to retain their local accent since the target is no more native-like performance but intelligibility which leads to a successful communication among the interlocutors, (Jenkins, 2000; McKay, 2002

However, Nigeria as a multilingual country is a member of the global world evolving a new variety of English as one of the 'International Englishes', 'New Englishes' and of course 'World Englishes' (WE) (Pan 2005:21; Kachru, 1980 and Pride 1982; Bolton, 2003, 2005), which occur as a result of the romance of English language with the indigenous languages. To cushion the effect of the language multiplicity, three major identified Nigerian languages, namely: Hausa, Yoruba and Igbo are used as official languages in the locality where they belong alongside the English language as part of the effort to promote the indigenous languages while the English language remains the official unification language.

The accommodation role of the English language for these three major Nigerian languages in addition to other numerous minor languages and their dialects is not without its effect on the variety of the English language spoken in Nigeria, constituting a new variety of English known as the **Nigerian English**. However the focus of this study is on the Yoruba/English bilinguals.

2. Literature Review

2.1 Consonant Clusters

Consonant clusters are instances of two, three, or four consonants pronounced in succession without a vowel sound in-between. Researches (Celce-Murcia, Brinton, & Goodwin, 1996, p.82) have shown that only two and three consonant onset clusters are available in English language while two, three, and four consonant coda clusters are permissible. These and other researches such as Prince and Smolensky (1993), Eckman (1987), Broselow (1987 & 1993), Towell and Hawkins (1994), McCarthy & Prince (1995) Davidson (2006, 2011), Almahmoud (2011), Mensah and Mensah (2014) among others are evident of consonant clusters occurrence in English language.

However researches on various languages of the world have proved that while some languages have consonant clusters, they are illicit in many 'mother tongues', 'mother languages' or 'native languages' and this makes its pronunciation highly complicated, (Hansen, 2001; Broselow and Finer, 1991; Yuliati, 2014; Mensah and Mensah, 2014). Even in some countries where clusters are permitted, they still insert vowels before word initial clusters (Locke, 1983; Barlow, 2005)

2.2 The State of English Pronunciation in Nigeria

Studies have revealed that English language pronunciation in Nigeria like other 'Outer Circle' users of English is no more tailored towards acquisition of native-like accent but intelligibility among the interlocutors, (Jubril, 1982; Dairo, 1988; Afolayan, 1989; Onuigbo, 1996). However, it is worthy of note that, it is not all varieties that are widely acceptable, if intelligibility has to be maintained, (Banjo, 1971; Bamgbose, 1983; Bamiro, 1991; Udofot, 2003; Fakoya, 2004; Jowitt, 2008, Ugorji, 2010, 2012; Yuliati, 2014).

Based on researches, the Received Pronunciation (RP) is discovered to have lost its dignity even in its homeland (Awonusi, 1989, 2004; Adegbija, 2004). In Nigerian situation, pronunciation of the English language was divided as contained in Banjo, (1971) into four major varieties of English used by Nigerians are branded, namely:

- Variety I - This is identified as the type of English spoken by Nigerians which has a greater percentage of mother tongue features (L1 Transfer).
- Variety II & III - These are locally acceptable and internationally intelligible.

- Variety IV - This variety is the one spoken by Nigerians with English language as their First language.

This was later compressed into three divisions, namely: acrolect, mesolect and basilect (Bickerton, 1973; Bamgbose, 1982). Jubril (1982) in his own description of Nigerian English employed geographical and tribal differences to arrive at varieties of Nigerian English. He named them as Yoruba English, Hausa English and Igbo English. He goes further to describe Nigerian English based on social degrees as Basic Hausa English, Sophisticated Hausa English Southern English, Sophisticated Southern English, Southern Influenced Hausa English and Educated Yoruba English.

They were modified into two by Fakoya (2004) as mesolect and the basilect. To him acrolect does not exist in Nigeria, instead it is replaced by what he termed as Mediolect (formed from mediocre and lect). It is believed that there are only two varieties of English in Nigeria of today. These are the mesolect (adulterated variety) and the basilect (quite far from the standard form, a local variety) in the area of morphology, syntax and semantics. These two are what Jowitt reduced to 'Popular Nigerian English' (Jowitt, 1991; 2008) and what Ugorji (2010) referred to as Nigerian English Phonology.

2.3 Studies on Consonant Cluster Production by L2 Nigerian Users of English

Apart from the various studies from foreign countries referenced above, just a few studies have been done by Nigerians on consonant cluster production by L2 learners. In most cases consonant cluster is mentioned as a fragment of a study, not a comprehensive study of it. Okeke (2011) carried out a study on the Igbo language identifying the sources of their "errors" of pronunciation and suggested treatments for the pronunciation errors. His work was precisely on segmental features and he identified difficulty in pronunciation of syllable final consonants of words such as 'part' pronounced as 'pati'. Apart from that Igbo L2 speakers of English find consonant clusters, whether in initial or final position, difficult except any initial consonant cluster of two consonants where the final consonant is either /j/ or /w/.

Ikima (2012) in a study on the Tiv speakers of the English language as a second language reveals how the Tiv deal with complex syllables margins in their second language pronunciation with emphasis on pronunciation of complex English syllables. It accounted for errors that emanated from pronunciation of English syllables that contain consonant clusters. In the study, he discovered that Universal markedness of consonant clusters is a significant factor that motivates Tiv bilingual to simplify complex syllable margins in their English pronunciation. Using Optimality Theory, (OT), he accounted for the errors of syllable pronunciation of the Tiv/English Bilinguals. This study exposed that Tiv/English bilinguals use epenthesis to simplify syllable, which reflect the simple nature of the Tiv phonotactic syllable structure. The study only examined cluster at the intra-syllabic level leaving out the inter-syllabic clusters.

Ishaya & Yakubu (2014) in an investigation on pronunciation problems among Jukun (Wapan) speakers of English provides information on why these problems possibly occur and the specific English phonemes that Wapan speakers of English find difficult to pronounce or articulate. The study revealed that, pronunciation problems among the people are traceable to L1 transfer but in spite of this "we cannot generalize because even among the people, ranging from the very highly educated to those with limited education we find a very great range of usage". Another area of pronunciation difficulty among Wapan speakers of English is consonant clusters.

The above corroborates Anderson, (1987); Weinberger, (1987); Hansen, (2001); Yoo, (2004); Byrd, (1996); Davidson, (2005); Chan, (2007) and Gut, (2008), among others, who, base on their own studies, are of the opinion that absence of consonant clusters in L1 leads to deletion of consonant(s) in coda clusters. It is an indication that Wapan has a universal feature with some other languages of the world like Mandarin, Japanese, Korean, Cantonese etc.

A study by Fadoro and Oludare, (2014:1) examined nativization of Arabic names loaned into Yoruba language. It observed that, most of the Arabic names are nativized through application of some phonological processes such as, epenthesis, substitution and insertion of extra-medial vowel to break consonant cluster final position to avoid coda cluster, since Yoruba is an open-syllable language. According to them, substitution occurs in instances 'where the Arabic consonant in a name is not attested in Yoruba'. This study, though is on

consonant cluster is on Arabic names not English. It is necessary to see if what applies to Arabic also feature in English words.

Another notable study relevant to this study is Bamisaye and Ojo (2015), in a study of Phonotactic Adjustments in Yoruba Adaptation of English Syllables. It examines the nativization of the English consonant structures in the word-initial and word-final positions by Yoruba-English bilinguals. In contrast to most of the studies above which observe the influence the L1 has over the L2,. In their study, they investigate the influence Yoruba has on English language.

In the study, they discovered some methods usually used by Yoruba-English bilinguals to moderate clusters, such as epenthesis, deletion and re-syllabification. The study however is on loan words. It is essential to find out if these methods are applicable to other English consonant cluster words.

From the foregoing, it can be deduced that studies on consonant clusters in Nigerian context are very few. Consonant clusters are treated as integral part of a study in majority of the studies on pronunciation. There is the need to go into a comprehensive research on consonant clusters production in Nigeria as one of the factors informing the advocated Nigerian English.

3. Research Methodology

This research work provides answers to the following questions: In what ways are the realizations of consonant clusters of the selected Undergraduate Yoruba/English Bilinguals (UYEB) different from that of the native speakers? What factors are responsible for these differences? Are they linguistic, such as: L1 transfer or Markedness or phonological environments of sounds or non-linguistic? What are the methods employed by the speakers for convenience that lead to the differences in consonant cluster realization? What are the levels of intelligibility of these realizations and what implications do they have for comprehension?

The population sample for this study consists of 60 (30 male and 30 female) between ages 18 and 35 purposively selected Undergraduate Yoruba/English Bilingual (UYEB) from various Yoruba dialect backgrounds. They were NCE, Polytechnic, and University students. Twenty (20) each were selected from the three levels of education. The students were in their final year and have acquired sufficient knowledge of English pronunciation. The purpose for this is to discover the varieties of consonant clusters that are generated from these set of students based on their linguistic backgrounds with a view to further describing the phonological features of Nigerian English.

3.1 Research Instrument

A questionnaire was employed to elicit information from the respondents on their personal, linguistic and educational background. This was with a view to facilitating our understanding about the existing patterns of consonant clusters. Variables such as sex, age, educational and linguistic backgrounds are necessary for the validity of the data.

Secondly, a wordlist reading task and a passage containing consonant clusters were provided for pronunciation test. This is in line with the opinion that better controlled wordlist or passage reading production tasks, such as the one below tend to yield higher levels of accuracy than more 'spontaneous' tasks like conversations (e.g. Lin, 2001 and Hanson, 2004).

3.2 Data Collection

A set of questionnaire was given to respondents to fill for the required information for the study. There were 17 items for them to respond to which were believed to have helped in our observations. The respondents' names were not required to enable them give correct information confidently. Instead they were given numbers and letters to represent them.

Their pronunciations were recorded using audio recorder with a 44kHz16bit. The recording took place in a language laboratory to ensure perfect silence in order to avoid interference in the course of recording. In some cases where a language laboratory was unavailable, a quiet room was used and the speech recorded in such a room was transferred into the laptop VLC Media Player for audibility of the sounds. A respondent was taken per time. This enabled us to get accurate pronunciation of the respondents.

4. Data Analysis, Findings and Discussions

The second phase of the analysis was the read-aloud in which a list of fifty words and a passage containing some of the words in the list were read aloud by each of the respondents. The collected data were transcribed using WASP electronic speech analysis tool on the basis of L1 Transfer by James (1988) and (Markedness Differential Hypothesis (MDH) Eckman (1987, 2008) and analyzed using the Optimality Theory by Prince & Smolensky (1993); McCarthy & Prince, (1994, 1995). Optimality Theory is a deviation from the conventional Generative Phonology propounded by Noam Chomsky and Halle (1968). This has enabled us to explain the reasons behind the various consonant realizations by the respondents.

Analysis of Respondents' Background Information

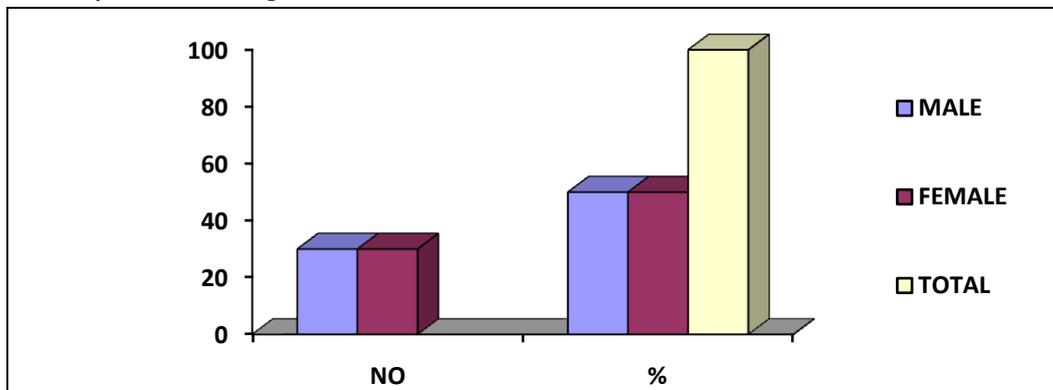


Figure 1: Analysis of the Sex Variable

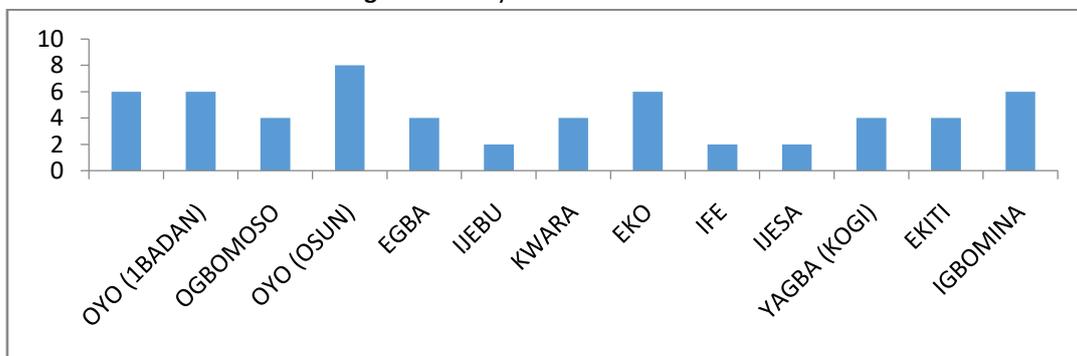


Figure 2: Analysis of the Location Variable

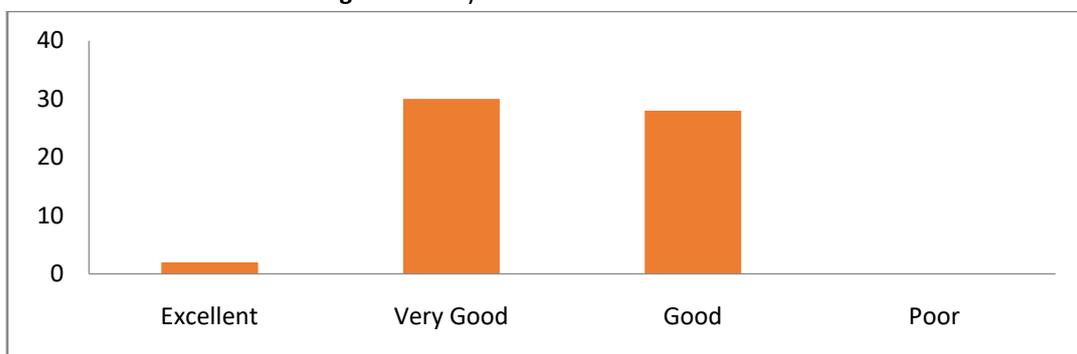


Figure 3: Analysis of English language Proficiency

Analysis of the Read-Aloud Words and Passage

We employed the following constraints in our analysis. Each of the words was analyzed in a table.

- Complex (*CC) stands for 'No clusters'.
- NOCODA = (e.g. asks)
- DEPENDENCE (DEP-IO) = Output must correspond to input (No epenthesis ie. No vowel insertion or insertion of any material not found in the input)

- MAXIMALITY (MAX-IO) = Input must correspond to output (No deletion)

Shows the optimal candidate

* Marks violation

*! Represents a fatal violation which leads to elimination

W = Word

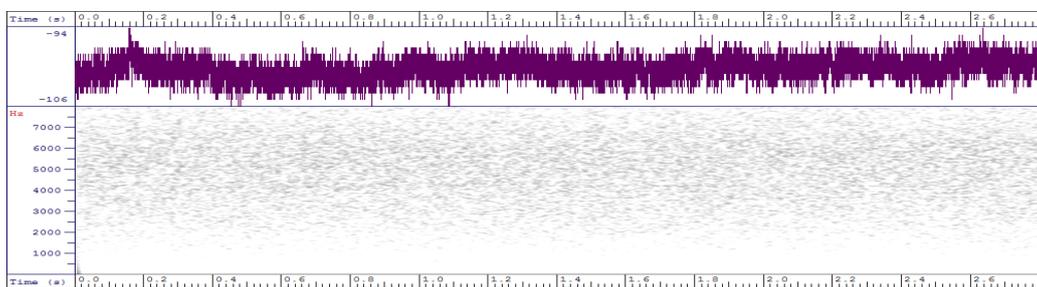
RP = Received Pronunciation

R1, R2, R3 etc. = Respondents

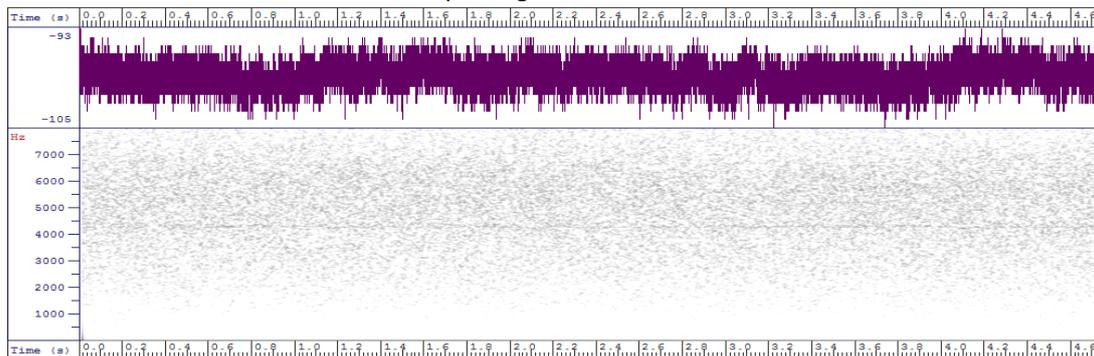
Below is a sample analysis of three of the fifty words because of lack of space. Below each table is a figure showing the spectrogram of the optimal candidate. A spectrogram shows how the frequency content of a signal changes with time.

Table 1

W1	RP	W1R1	W1R2	W1R3	W1R4	W1R5	W1R6	W1R7	W1R8	W1R9
Ancient	eɪn.tʃənt	eɪŋ.ʃɪnt	eɪ.ʃɪnt	an.sɪnt	eɪ.ʃɪnt	eɪn.ʃɪnt	ɛɪ.ɪ.sɪnt	eɪ.ʃɪnt	eɪŋ.tʃɪnt	eɪ.ʃɪnt
*COMPLEX (*CC)		*!	*!	**!		**!		*!	*!	*!
Max-IO		*!	*		**		*			
Dep-IO			*	*	*		*			



Spectrogram of W1RP

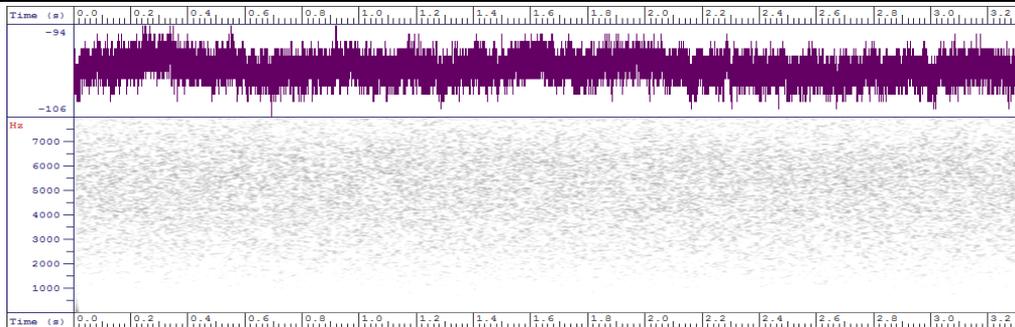


Spectrogram of W1R6

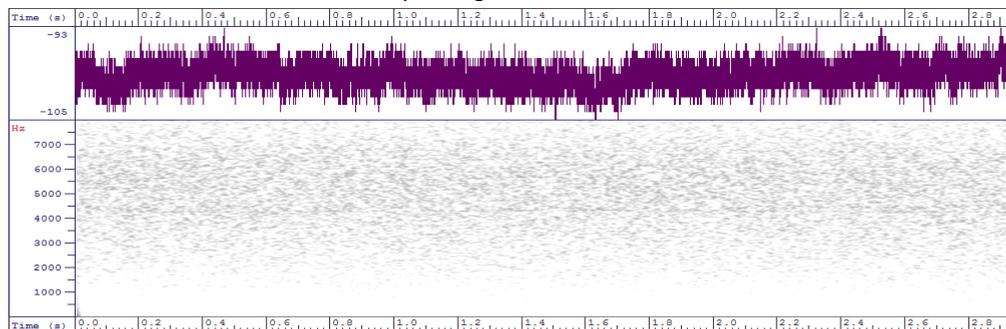
In W1, W1R6 emerged the winner having violated the least constraint. The reason for the violation of Dep-IO boils down to the fact that the palate-alveolar affricative /tʃ/ is absent in respondents' L1 which makes it more marked, leading to the substitution with the palate-alveolar fricative /ʃ/ or the alveolar fricative /s/ which are both present in Yoruba language. Candidate W1R6 has advantage over candidate W1R4 because it did not change the diphthong /ie/ to monophthong /e/ like its counterpart.

Table 2

W2	RP	W2R1	W2R2	W2R3	W2R4	W2R5
February	feb.ru.əri	Fe.bru.æ.ri	Fe.brɪ	Feb.ru.ə.rə	fə.brə.ri	Fe.bu.əri
Complex *CC		*!	*!	*!	*!	
NOCODA				*!		
Max-IO			*		*	*
Dep-IO		*		*		



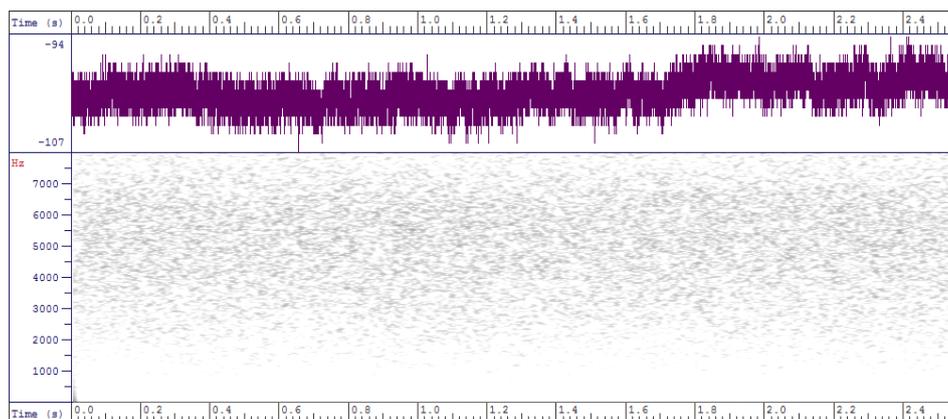
Spectrogram of W2RP



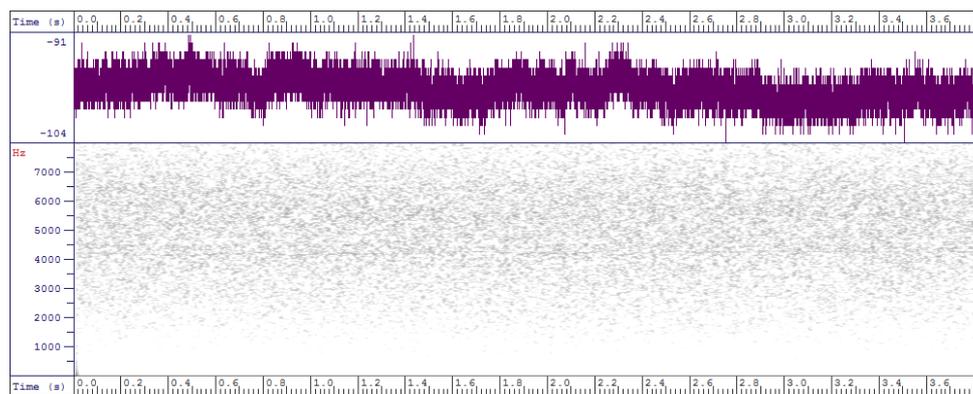
Spectrogram of W2R5

Table 3

W3	RP	W3R1	W3R2	W3R3	W3R4	W3R5
Wednesday	wenz.dɪ	We.nes.deɪ	Wens.deɪ	Wes.deɪ	Wed.nes.deɪ	Wens.dɪ
*Complex (*CC)			*!	*!	*!	*!
Max-IO				*		
Dep-IO		*			*	



Spectrogram of W3RP



Spectrogram of W3R1

In the above table all the candidates except W3R1 violate the highest ranked constraint, *CC. This is because both exhibit either intra or inter-syllabic clusters because of the bisyllabic clusters which make this feature to be more marked compared to the phonotactic rule of the native language which forbids cluster. Both W3R2 and W3R5 are the most faithful candidates causing them to violate the fatal constraint *CC. Therefore candidates W3R1 emerged the winner despite its violation of Dep-IO.

5. Conclusions

From this research, we have been able to describe the various consonant productions of educated Nigerians using UYEB. It was discovered that even with our respondents' phonological exposure they did not pronounce clusters as native speakers. Secondly, their renditions were not the same in some cases making it difficult to pin down a particular rendition as a standard one for Nigerian English. There were cases of L1 interference as a result of dialectal variations. While some of their renditions are intelligible only locally, some may be considered internationally while some are completely errors.

Also, Researches above have proved that L1 interference is not the only factor that has culminated in the existing varieties. There are some factors like Markedness difference, the learners' behaviour, socio-cultural background, developmental skill, articulatory factor etc. Various methods employed by L2 users of the language for simplification have been explored in this research. Harris (2006: 1491) points out that speech is somehow paradoxical, in that most of the sound energy is concentrated in vowels but most of the linguistically relevant information is bore by consonants. This assertion authenticates the role of consonant to meaning. Many at times respondents dropped consonants thereby leading to unintelligibility. Communication is no communication except it is understood. Arbitrary deletion of consonants as indicated in some of the UYEB's pronunciation may mar intelligibility. While deletion of vowel sound may be less significant for meaning, deletion of consonant may go a long way in making an utterance meaningless.

However, we can conclude that while some of UYEB rendition could parse for acrolete or Variety II and III (Banjo, (1971) e.g /*ɒptæmɒlədʒɪst*/, some will be qualified for mesolect e.g. /*ɒptæmɒlədʒɪs*/ some are errors and below intelligibility level and therefore categorized under basilect: e.g *ɒfæmɒlədʒɪst*, *ɒprɒmɒlədʒɪst* and *ɒptæmɒrələdʒɪs*. This shows that UYEB did not produce non-native cluster with equal accuracy. This buttresses Some other factors noticed to be responsible for the various realizations are individual differences, /*meɪkdnəs*/, dialectal interference, /*ɛɪsɪet*/, morpho-phonological (sound-spelling correspondence) /*ˈgrædueɪt*/, /*ɪstɛnɪŋ*/ (Soneye, 2007) as a result of lack of phonological awareness. (Olofin, 2011). Contrary to some previous studies, our respondents dropped the final consonant in the word 'principal' pronouncing the final syllable as either /*pæ*/ or /*pu*/ while for instance Akinjobi, (2009) in her own study discovered that 92% of her subjects pronounced the 'pl' as 'pal' as a result of spelling influence. What is experienced in this study is substitution of vowel for the last syllabic consonant in 'principal'.

With the aid of OT, we have been able to account for various renditions by educated Nigerians which culminate in Nigerian English as well as suggestible renditions acceptable as Nigerian English. It is obvious from the foregoing that Markedness plays a vital role in varieties of cluster rendition by L2 users of English. L1 Interference or CAH cannot be completely thrown away but it should be noted from the research that there is

also L2-L1 interference which is positive. At this juncture, it is important for L2 users of English to take various settings where the language is required in their pronunciation into consideration.

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