Optimality theoretical analysis of word-stress in educated Nigerian English

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This study investigated the cognitive processes that inform stress patterns in Nigerian English (NE) with a view to bringing out how the universal constraints are reranked to produce the optimal candidates. Optimality Theory served as the theoretical base. Specially prepared normative texts were given to 150 educated Nigerians from the three major language groups (Hausa, Igbo and Yoruba). The recorded productions were analysed perceptually, theoretically and acoustically. NE exhibits peculiarities in stress assignment. There was a natural reordering of the universal constraints to produce a largely uniform stress pattern in NE. The participants showed a preference for a more rightward syllable for primary stress, which resulted into segmental changes. The constraint ranking was consistent for all the words tested: ROOT >> TROCH >> *CSR >> NON-INI >> WTS, P SYLL >> ALIGN L, FTBIN, in different forms.

Keywords: *Stress, Constraints, Cognitive processes, Nigerian English, Optimality Theory*

1. Introduction

Nigerian English (NE) has often been measured against Standardized British English (SBE). Recently, voices claiming a Nigerian English standard variety with systematic differences from British English and from other new Englishes have become louder. Studies have revealed that the many years of contact between English and over four hundred indigenous Nigerian languages (Bamgbose 1971) have resulted in nativised varieties. These varieties have peculiar segmental and supresegmental features (Atoye 1991; Udofot 2003a; Udofot 2003b; Akinjobi 2004; Sunday 2010). Many scholars have worked on classifying these varieties (Brosnahan 1958; Jibril 1982; Jowitt 1991; Banjo 1996). All these scholars agreed that there are non-standard varieties and a standard variety that approximates closely to the Standardized British English (SBE), with diverse members in the continuum.

There are studies devoted to identifying and classifying these sub-systems. Brosnahan's (1958) classification was educationally determined. He identified four varieties: Variety I represents the performance of those that have no formal education; Variety II describes the performance of Nigerians with only primary school education; Variety III represents those that have only the secondary school education completed; while Variety IV describes those that have university education.

Banjo's (1995) classification is based more on linguistic parameters than on educational attainment. The varieties are distinguished based on the degree of their deviation from the SBE. This classification is based on the extent of mother tongue transfer and approximation to a world standard (Banjo 1995: 209). He distinguishes four varieties: Variety I exhibits a high degree of transfer from the mother tongue features, especially in phonology and vocabulary; Variety II is close to the SBE in syntax but with deviant phonological and lexical characteristics; Variety III is much closer to SBE and "represents the acrolectal use of English in Nigeria" (Banjo 1996: 78); while Variety IV is marked with completeness. It is identical with SBE but it is locally ridiculed.

With the written form of English as the criterion, Adesanoye (1973) identifies three varieties of Nigerian English: Variety I is identified with primary school leavers, modern school pupils and low grade workers; Variety II with secondary school leavers, many university students as well as most magistrates and many journalists; Variety III is associated with graduates, university lecturers, superior judges, administrators, editors, sophisticated authors and so on (Jowitt 1991: 40).

Another major parameter used in varieties differentiation is ethnicity. Jowitt (1991: 31) claims that ethnicity distinguishes "the various kinds of English that result from the interference of mother tongue." The more popular varieties are classified along the line of the three major languages, viz: Yoruba English, Hausa English and Igbo English. Others include Ijaw English, Igala English, Efik English, Ebira English, and Ibibio English. Jibril (1986) distinguishes between Hausa English and Southern English (a composite of Yoruba and Igbo English). Within each of these two varieties, he further distinguishes other sub-varieties: Basic Hausa English and Sophisticated Hausa English. In view of the sociolinguistic realities, he also recognises the emergence of Southern Influence Hausa English.

Udofot (2003b), in reaction to some of the deficiencies of earlier classifications, attempts a reclassification of the varieties. She recognises three varieties from her study of the usage of English in the Nigerian context. Variety I is nonstandard, spoken by primary and some secondary school leavers, some second-year university undergraduates, holders of National Diploma (ND) and National Certificate in Education (NCE) as well as primary school teachers. Variety II is the standard spoken by third- and final-year undergraduates, university and college lecturers, secondary school teachers of English, and holders of Higher National Diploma. Variety III is the sophisticated variety spoken by university lecturers in English and Linguistics, graduates in English and the Humanities and those who have lived in an environment where English is the mother tongue.

While Banjo's classification is more acceptable and more realistic to the present realities of spoken English in Nigeria, it is evident that language scholars have been unable to agree on what should be the defining characteristics of a local standard. Simo Bobda (2007: 281) avers that "this variety of English [NE] is actually a cluster of varieties." He further argues that "the multiplicity of English within national boundaries of English-speaking countries is a universal phenomenon to be particularly expected in Nigeria, whose territorial size, ethnic and linguistic fragmentation make it uniquely prone to diversity" (Simo Bobda 2007: 281).

2. Stress in Nigerian English

Stress is largely a foreign phenomenon to L2 speakers of English whose mother tongues are tonal languages. This is the situation with Nigerians who have learnt to speak their MTs before acquiring English. Describing the prosodic features of NE, Jowitt (1991) notes that, at word level, the difference between the prosodic features of NE and that of SBE is most salient in the area of primary stress placement. A description of the primary stress in NE reveals significant difference from SBE.

Kujore (1985) claims that there are certain features that are peculiar to NE in the area of stress. He gives a list of the features of NE pronunciation. Below are some of his findings:
1.   The tendency for forward stress in RP (Received Pronunciation) for example **col'league, pe'trol** and **sa'lad**. (RP**: 'colleague**, **'petrol, 'salad**)

2. Recurrence of forward stress in words with final syllable [n] and [i], for example, **bulle'tin, car'ton, jave'lin** (RP**: 'bulletin, 'carton, 'javelin**)
   a. –shift of stress in words with [i] in the final syllable, for example **Bap'tist, bis'cuit, ta'xi** (RP: **'Baptist, 'biscuit, 'taxi**)
   b. –women's forenames with a final syllable [i] or a final [n] have their stress on the final syllable, for example **Su'san, Vi'vian, A'lice** (RP**: 'Susan, 'Vivian, 'Alice**)
3. The recurrence of final stress in verbs with final obstruents, for example: **to boy'cott**, to **eli'cit,** to **in'terpret**, to **hi'jack**, to **soli'cit**, (RP: to **'boycott,** to **e'licit**, to **in'terpret**, to **'hijack**)
4. The recurrence of forward tress in compounds with final obstruents, for example: **fire'wood, proof'read, ward'robe, work'shop, bed'room**, (RP: **'firewood 'proofread**, **'wardrobe, 'workshop, 'bedroom**)

Jowitt (1991: 88) asserts that "at word-level, the difference between the suprasegmental phonology of PNE (Popular Nigerian English) and that of SBE is most salient in the area of primary stress placement." PNE exhibits a tone-influenced stress placement on English word. Jowitt gives the following examples of the stress patterns in PNE:

1. Dissyllabic words or compounds: **aˈcute, broadˈcast, chaˈllenge, fireˈwood, planˈtain, teaˈspoon**
2. Single words of more than two syllables
   a. Verbs (including regularly inflected parts), and nouns and adjectives derived from them by a suffixed **-or**, **-er**, **-ive**:
      i . Verbs ending in –**ate**: **congratuˈlate, investiˈgate**,
      ii. Verbs ending in –**ize** or –**ise: adverˈtise, civiˈlise**
      iii. Verbs ending in –**y: modiˈfy, occuˈpies**
      iv. Verbs ending in –**ish**: **distinˈguish, estabˈlished**
3. Nouns ending in –**ism**: **capiˈtalism, natioˈnalism, neˈpotism**
4. Hyphenated and open compounds of more than two syllables: **sitting-'room**, **eye 'hospital**, **grammar 'school** (RP: **'sitting-room, 'eye hospital, 'grammar school**).

Akindele (2008) focused on stress in Edo English (EE). EE is a sub-variety of NE. She assessed one hundred Edo speakers of English on disyllabic, trisyllabic, polysyllabic and compound words. The research confirmed that word stress pattern in EE differs from SBE word stress pattern because out of 3500 test items, the participants were able to appropriately stress 709 (19.2%).

Sunday (2008) worked on compound stress in NE, focusing on Educated Yoruba English (EYE). The participants of his study were 50 postgraduate students and a Briton, who served as the control participant. A prepared material was given to the participants to read; this was complemented with casual conversations among Yoruba speakers of NE. Metrical Phonology served as the theoretical framework. The study revealed that, for two-base compound nouns, adverbs and adjectives in EYE, the common pattern was for primary stress to fall on the first element, which is quite similar to the native speaker's pattern. Compound verbs behaved quite differently from compound nouns, in that, while in the latter, the Compound Prominence Rule (CPR) guided stress placement; either the CPR or the Phrasal Prominence Rule (PPR) guided stress placement in the former. He concluded that EYE has a

regular pattern in which compounds of all categories have word-initial primary stress, thereby obeying CPR. Conversely, in the speech of the native speaker, some of the compounds behaved like phrases, thereby observing PPR.

Simo Bobda (2010) studied the mental strategies used by Cameroonians and Nigerians to cope with the complexity of English word stress. Using an eclectic approach from Generative Phonology and Optimality Theory, he found that these L2 learners apply the law of 'minimal effort'. He observes that Cameroonians and Nigerians have revolutionalised the stress pattern of English such that a radical redistribution of stress has been observed. The 'new' stress system that characterises the two Englishes is influenced by the learners' knowledge of the general rules of English and other *sui generis* strategies devised in the course of indigenisation. He notes that, contrary to Atoye's (1991) view that any attempt to explain the behaviour of stress in English could only be speculative, stress placement in Nigerian and Cameroonian Englishes show regular characteristics. He identifies the following as some of the strategies Nigerian and Cameroonian speakers of English use in assigning stress:

1. The learner's knowledge of the general rule of backward and antepenultimate syllable stress in English which still motivates stress placement in loan words;
2. The learner's knowledge of word class as a guide to word stress placement: nouns and adjectives have initial stress while verbs have a final stress;
3. Reliance on syllable weight, that is, heavy syllable is considered as a viable position for stress to the extent that the grapheme (-ai) is presumably perceived as a diphthong when it occupies the nucleus position;
4. The learner's knowledge of the generalised application of the stress properties of affixes which usually ignores exceptions;
5. Reliance on the stress pattern of the base for stress placement on derivatives;
6. A tendency to apply final stress to some words ending with segments like /ɪ/ and /n/;
7. Stressing of the final syllables of verbs ending with obstruents; and
8. A tendency to move stress to a later syllable.

Sunday (2010) examined the patterns in stressing phrases in NE. He observes that because stress is free in English, it is difficult to have any rule of stress without any exceptions and this creates serious problem for L2 speakers of English; a group to which Nigerians belong. He used the tape-recorded reading of structures and passages containing different phrases from 50 Nigerian postgraduate students, radio discussion programmes, and casual conversations. A Briton served as the control participant.

The following are some of Sunday's findings:

i.   Two-base noun phrases in NE could obey both Compound Prominence Rule (CPR) and Phrasal Prominence Rule (PPR): CPR when the nominal is pre-modified by adjectives and PPR when the nominal is pre-modified by articles and possessives. This pattern shows predictability and is akin to phrasal stress in RP.
ii. In three-base noun phrases, most NE speakers assign primary stress to the second lexical item. This shows variance with RP, where the headword, which is always the last element, is assigned the primary stress.

iii.   For two-base verb phrases, the second base is assigned the primary stress because it is the main verb, while the first, which is the auxiliary, is weak. This pattern is similar to what obtains in RP, which also applies the PPR like NE.

iv.   Adjective phrases and adverb phrases are noted to obey the CPR, where stress is assigned to the first base; the reverse is what occurs in RP. The native speaker too, like some NE speakers, made the adverb of degree strong and the adjective weak, thereby following the NE pattern.

v.   For prepositional phrases, most times, the preposition, which is usually the first element, takes the primary stress. Conversely, the native speaker shared the primary stress between the first and the second component lexical items.

These studies have examined and described the cognitive processes that inform stress placement in English words in the Nigerian context. The interaction between the knowledge of the existing stress system of English (the traditional factors determining stress placement) and some other factors (the *sui generis* local factors) added to the grammar of English during the course of indigenisation were also examined.

3. Methodology

One hundred and fifty Nigerian speakers of English from the three major ethnic groups: Hausa, Igbo and Yoruba, served as the participants; each ethnic group had fifty representatives. These were those whose level of spoken English was similar to Banjo's Variety III, that is, those who speak the variety that makes vital phonemic distinctions, making it acceptable and intelligible both nationally and internationally. In view of this, persons with not less than National Diploma and Nigeria Certificate in Education were selected.

The prepared text read by the participants were tape recorded. The classes of words tested were nouns, verbs, adjectives, adverbs. The analysis was based on the most common stress patterns. Optimality Theory was used to explain the cognitive process of the observed stress patterns.

4. Optimality Theory (OT)

Optimality Theory recognises all possibilities even if it is non-occurring. It argues that universal grammar is simply a set of violable constraints and that the grammars of specific languages are products of the language-particular rankings of those constraints. OT sees the phonological or, more generally, the grammatical inventory of a language as a set of universal constraints or a family of constraints that are allowed to all apply uninhibited (Lombardi 2001). However, OT allows violability because "the application of one rule can affect the subsequent application of other rules either by inducing it or by blocking it" (Roca & Johnson 1999: 584). Unlike rule-based derivational theories, OT is constraint-based; that is, there are no phonological rules or serial rule ordering and derivations to determine the correct surface or output form of a phonological input. Instead, optimal output forms are determined by the interaction of universal, violable constraints.

There is no mechanism for ensuring that any one type of stress is assigned before another since all evaluations in OT is done in parallel. The two major constraint families are Markedness constraints and Faithfulness constraints. The three OT mechanisms: Generator, Evaluator and Constraints, are used to provide clear explanations. **GEN**(erator) generates a universal set of potential output forms, or candidates, for a given input, and specifies a relation between those output forms and the input **CON. CON**(straints) is the universal set of violable constraints, which are present in the grammars of all languages. **EVAL**(uator) evaluates, in parallel, the set of output candidates with respect to the language-particular hierarchy and determines which output form is optimal (McCarthy 2008).

Analysis is presented on a tableau where all the generated possible outputs are arranged in vertical columns and constraints are in horizontal columns. Higher ranking is presented in the tableau with the use of a continuous unbroken vertical line between the columns of the two relevant constraints. The absence of ranking is denoted with dotted lines in the tableau to show that the constraints are mutually unranked. A violation of high-ranked constraint is considered a fatal violation and no further evaluation will be needed. Constraint violations are indicated with asterisks (*) (many violations of the same constraint cause more '*') while a fatal violation is represented by (*!) and the candidate's fields for the lower-ranked constraints are shaded. The candidate that incurs the least violation of high ranked constraint is considered the winner. This winner is marked with a thumb-up or a pointing finger (☞). In prose form, ranking is indicated with '>', while ',' indicates that constraints are mutually unranked.

Within OT, word stress has mainly been analysed using concepts borrowed from Metrical Phonology. OT borrows the idea of metrical relations between syllables (Tesar 1996; Frid 2001). In Metrical Phonology, stress is seen as a relational concept, in that a syllable is prominent because there is another syllable close to it that is not prominent (Sunday 2010:49). This means that syllables are arranged in twos of one stressed and the other unstressed. This pattern of alternation is known as a metrical foot.

The constraints relevant in the discussion of stress in NE are:

i.   **ROOTING**: Content words must be stressed (Hammond 1997: 44).
ii.   **FT-BIN**: Feet are binary at some level of analysis (moraic or syllabic). This constraint demands either that a foot contains two moras (μ μ), as in monosyllabic (H) and disyllabic (LL), or two syllables (σ σ), regardless of their weight (Kager 1999: 161; McGarrity 2003: 21).
iii. **PARSE-SYL or PSYLL**: Two unfooted syllables cannot be adjacent. Kager (1999) notes that any syllable violating this constraint will be assumed to be metrified as an immediate daughter of the prosodic word. This assumption is known as weak layering. This means that no syllable is allowed to be in isolation.
iv.   **ALIGN-L or ALL FT-LEFT** : Align (Ft, Left, Pr Wd, Left): Every foot must stand at the left edge of the PrWd. This constraint states that the left edge of every foot must tally with the left edge of every prosodic word (Kager 1999: 163).
v.   **TROCHEE or Ft-TYPE** ₜᵣₒᴄ: Assigns one violation mark for every foot that is not left-headed (Prince & Smolensky 1993; McCarthy & Prince 1993).
vi.   **WEIGHT-TO-STRESS PRINCIPLE (WSP)**: Assigns one violation mark for every heavy syllable that is unstressed.
vii. **NONINITIALITY (NON-INI)**: Assigns one violation mark for every foot that is word-initial (Alderete 1995).

viii.   ***CSR:** Assigns one violation mark for every instance of a schwa between a consonant and a retroflex.

5. Stress in educated Nigerian English

Presented below is the important socio-cultural information of the participants.

Table 1: Socio-demographic information on the participants

	Ethnicity			Profession						Age				Education		
	H	I	Y	A	B	C	D	E	F	<20-30	31-40	41-50	51-60	X	Y	Z
Male	34	24	26	27	15	14	22	3	3	31	36	11	6	32	39	13
Female	16	26	24	20	16	15	2	6	7	19	34	8	5	28	32	6
Total	50	50	50	47	31	29	24	9	10	50	70	19	11	60	71	19
	150			150						150				150		

Keys: **H** - Hausa   **A** - Students   **X** - National Certificate in Education,
　　 I - Igbo   **B** - Teaching and Research   National Diploma or its equivalent
　　 Y - Yoruba   **C** - Civil/Public Servant   **Y** - Higher National Diploma, University
　　　　　　　　　　 D - Security agents   Degree or its equivalent
　　　　　　　　　　 E - Artisans   **Z**- Postgraduate degree/diploma (Master's,
　　　　　　　　　　 F - Others   PhD, etc.

5.1 *Stress patterns in disyllabic nouns*

For this category of words, ***nation, mandate, July, cassette, magic,*** and ***madam*** were tested. Only ***nation***, had a uniform stress pattern among all the 150 participants, who stressed the first syllable. With the other words, however, there were variations. For ***Mandate,*** only one male participant stressed the second syllable (***man'date).*** This gives an insignificant 0.6%, compared to the 99.3%, who stressed the first syllable. ***July*** and ***Cassette*** were both stressed on the first syllable by the majority, giving ***'July*** and ***'Cassette*** respectively. The analyses of the words are presented below:

Stress pattern of *July*
A total of 107 (71.3%) participants stressed the first syllable. This implies that, generally, the first syllable is the preferred one for primary stress placement.

Table 2 Emergence of *'July*

Input /ʤuˈlaɪ/ ⟶ Output /ˈʤulaɪ/

		TROCH	NON-INI
☞ (i)	(ˈʤulaɪ)		*
(ii)	(ʤuˈlaɪ)	*!	

Constraint ranking: TROCH >> NON-INI
Optimal candidate: /ˈʤulaɪ/

If NON-INI was ranked higher than any other constraints, it means that no word will bear primary stress on its first syllable. Evidently, for this optimal candidate, this constraint has been demoted in order to satisfy TROCH. The position of TROCH in relation to the competing constraint explains why the violation of this constraint by candidate (ii) was fatal. Candidates (i), however, did not incur a violation of this constraint. Even though it violated NON-INI, it was of a lesser relevance to the analysis because it was lower in the hierarchy. Therefore, despite its violation of this lower-ranked constraint, candidate (i) was the most harmonic in relation to the constraint ranking and thus it emerged as the optimal candidate.

This constraint ranking was repeated for **mandate**, **nation**, **cassette** and **magic**. For all these words, TROCH is a high-ranking constraint and its subsequent violation by any candidate is considered fatal.

Below is the Praat image of **July,** showing the pitch variation.
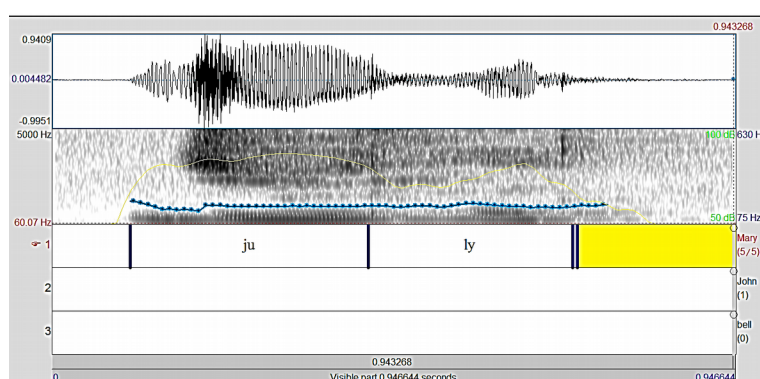

Figure 1: Praat image of *July*

This spectrum shows how the first syllable in **July** came to be regarded as the stressed syllable of the two. From the image, the rising of the pitch is indicated. The pitch of the first syllable is measured at 210.5Hz as against 196.6Hz of the second syllable. Its duration of 0.32 ms and intensity of 87.1db also distinguish it as the more prominent of the two.

Stress pattern of *madam*
Unlike the other disyllabic nouns, **madam** is more commonly stressed on the second syllable. The stress shifted to the final syllable in the renditions of 126 (84%) participants. The realisation of stress on the first syllable was in 16% of the participants, most of whom were male.

Table 3: Emergence of *ma'dam*

Input /'mædəm/ ——→ Output /mæ'dɑːm/

	NON-INI	WTS	P SYLL
(i) ('mædɑːm)	*!	*	
☞ (ii) mæ('dɑːm)			*
(iii) ('mædəm)	*!		

Constraint ranking: NON-INI >> WTS, PSYLL
Optimal candidate: /mæ'dæm/

Table 3 shows that in the Nigerian pronunciation of **madam**, the peak of the second syllable, which has a long vowel, is considered heavier than the first. Three candidates were generated. Candidate (iii) was generated in order to show that there are some NE speakers who follow the SBE stress pattern in some words, although such pattern is less popular. The optimal candidate (candidate (ii)) satisfied the highest-ranking constraint but violated PSYLL, which was lower in the hierarchy; but because of the ranking of this constraint, such a violation was not considered fatal. Candidates (i) and (iii) assigned primary stress to their first syllables. This pattern made them violate NON-INI, which was ranked higher than the mutually unranked WTS and PSYLL.

5.2 *Stress pattern of trisyllabic nouns*

Tested here were nouns of three syllables each. Six lexical items were considered: **opinion, emotion, faculty, candidate, punishment** and **seventeen**. These words had varying stress patterns that are inconsistent across the participants. **Opinion**, **emotion** and **faculty** had stress on their second syllables by all or a majority of the participants.

Stress pattern of *Faculty*

Faculty showed some variation in its stress pattern. Fifty-five participants had a pattern similar to what obtains in SBE. This population stressed the first syllable (**'Faculty**). This brings the percentage to 36.6%. 97 participants, made up of 45 males and 52 females, assigned the primary stress to the second syllable.

Table 4: Emergence of *Fa'culty*

Input /'fæklti/ ——→ Output /fæ'kɒlti/

	ROOT	TROCH	NON-INI	ALIGN L
(i) ('fækɒl)ti			*!	
☞(ii) fæ('kɒlti)				*
(iii) fæ(kɒl'ti)		*!		*
(iv) ('fæklti)	*!			

Constraint ranking: ROOT >> TROCH >> NON-INI >> ALLIGN L
Optimal candidate: /fæ'kɒlti/

Table 4 shows that ROOT, which mandates the presence of vowel in the syllable peak position, is the highest in the constraint hierarchy. The general pattern in NE is that syllable peaks are usually vowels. Therefore, syllabic consonants are usually replaced with vowels. Because of the /ɒ/ inserted by the Yoruba and Igbo participants and /ʌ/ inserted by the Hausa participants, the second syllable had a qualitative nucleus. This allowed it to contest for stress and, in fact, to emerge as the optimal candidate. This foregrounds the tendency of Nigerian speakers to avoid the leftmost edge of a word (Simo Bobda 2010).

The second syllable of candidate (iv) had a syllabic consonant as its peak. Therefore, it violated ROOT and is disqualified from further competing. Candidate (iii) had stress on the last syllable; therefore, it was rejected by TROCH. Candidate (i) included the first syllable in its foot, consequently, it incurred a violation of NON-INI. Candidate (ii) satisfied all the three highly ranked. This allowed it to emerge as the optimal candidate.
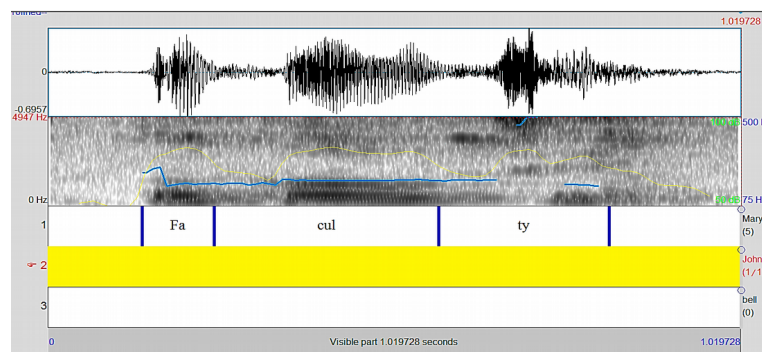

Figure 2: Praat image of *Faculty*

In this image, the second syllable of **faculty** displays the highest prominence and is the one marked for the primary stress considering its pitch value of 204.4Hz, duration of 0.33ms, and an intensity value of 82.5db.

In three other trisyllabic words: **candidate, punishment** and **seventeen**– stress was not assigned to the second syllable. Despite this, a look at their constraint ranking points to their tendency to follow the general constraint ranking in NE so far.

Stress pattern of *Seventeen*

In the pronunciation of **Seventeen**, 147(98%) participants stressed the third syllable, while only 3(2%) participants stressed the first syllable. Worthy of note is the fact that the population that stressed the first syllable was all-male.

Table 5: Emergence of *Seven'teen*

Input /sevn'tɪːn/ ⟶			Output /sɛvʊn'tɪːn/		
	ROOT	TROCH	NON-INI	WTS	ALIGN L
(i) ('sɛvʊn)tɪːn			*!	*	
(ii) (sɛ'vʊn)tɪːn		*!		*	
(iii) (sɛvn)'tɪːn	*!				
☞ (iv) sɛvʊn('tɪːn)					*

Constraint ranking: ROOT >> TROCH >> NON-INI >> WTS >> ALIGN L
Optimal candidate: /sɛvʊnˈtɪːn/

There are three distinctive syllables each having a vowel as its peak. The epenthetic vowel in the second syllable varies, ranging from /ɪ/ and /ʊ/. A few others maintained the syllabic nasal and therefore realised /vn/. However, the most common is /sɛvʊntɪːn/.

In candidate (iii), the second syllable had a consonant as its peak. This made it to incur the violation of ROOT, which is non-violable because of its ranking. Candidates (i) and (ii) also incurred a fatal violation of NON-INI and TROCH. Candidate (iv) had a lengthened nucleus probably because it occupied a marginal position. The lengthened syllable had two moras which allowed it to constitute a foot by itself in compliance with FTBIN. It also eventually emerged the winner because it did not violate any of these high ranked constraints.

For trisyllabic nouns, the participants showed a general preference for the second syllable. The words *emotion, opinion,* and *faculty* were all assigned primary stress on their second syllables. *Candidate* and *punishment* got primary stress on the first syllables, while *seventeen* got on the third. It is evident that, despite the positional differences for primary stress, the constraint ranking for the trisyllabic nouns is constant.

5.3 *Stress patterns of polysyllabic nouns*

Six words were tested in this category: four (*disloyalty, ambassador, opposition* and *television*) have four syllables each; the other two (*university* and *professionalism*) have five and six syllables each.

Stress pattern of *Television*
Television was pronounced as ***tele'vision*** by all the participants. This means that none realised the SBE form, where stress is on the first syllable.

Table 6: Emergence of *tele'vision*

Input /ˈtelɪvɪʒn/ ⟶ Output /tɛlɪˈvɪʃʊn/

		ROOT	TROCH	NON-INI	ALIGN L
(i)	(ˈtɛlɪ)vɪʃʊn			*!	
(ii)	(tɛˈlɪ)vɪʃʊn		*!		
☞ (iii)	tɛlɪ(ˈvɪʃʊn)				*
(iv)	tɛlɪ(vɪˈʃʊn)		*!		*
(v)	(ˈtɛlɪ)vɪʒn	*!		*	

Constraint ranking: ROOT >> TROCH >> NON-INI >> ALIGN L
Optimal candidate: /tɛlɪˈvɪʃʊn/

According to the constraint hierarchy, it is only candidate (iii) that did not violate any of the higher ranked constraints. Candidate (vi) violated ROOT, while (ii) and (iv) incurred a violation of TROCH and NON-INI respectively. These constraints have been constantly high ranking in NE. The non-violation of these constraints by candidate (iii) is what earned it its position as the optimal candidate. This is similar to what was observed in *opposition.*
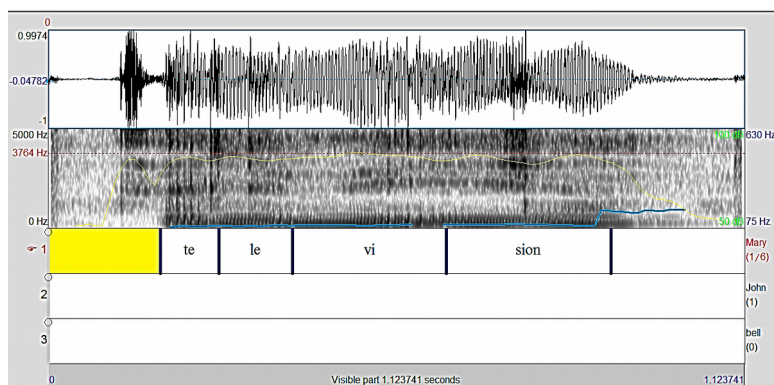
Figure 3: Praat image of *television*

In Figure 3 the relative prominence of the third syllable in relation to the other component syllables is observed. In *television,* the third syllable is marked for primary stress. This syllable has a pitch value of 96.3.3Hz, a duration of 0.19ms and an intensity value of 56.17db. This is closely followed by the first syllable which has a duration of 0.14ms, an intensity value of 66.47db and a pitch of 91.4Hz.

Stress pattern of *Professionalism*
All the participants placed the primary stress on the fourth syllable of ***professionalism***.

Table 7: Emergence of *professio'nalism*

Input   /prə'feʃənəlɪzəm/   ⟶ Output   /profɛʃɒn'ɑ:lɪzɪm/

	TROCH	NON-INI	WTS	ALIGN L
(i) ('profɛ)ʃɒnɑ:lɪzɪm		*!	*	
(ii) (pro'fɛ)ʃɒnɑ:lɪzɪm	*!		*	
(iii) pro(fɛ'ʃɒn)ɑ:lɪzɪm	*!		*	*
☞(iv) profɛʃɒn('ɑ:)lɪzɪm				*
(v) profɛʃɒnɑ('lɪzɪm)			*!	*
(vi) profɛʃɒnɑ:(lɪ'zɪm)	*!		*	*

Constraint ranking: TROCH >>NON-INI >> WTS >> ALIGN L
Optimal candidate: /profɛʃɒn'ɑ:lɪzɪm/

From our analysis so far, it is evident that, in NE, there is a general attempt to avoid the edges of a word. This is most evident in polysyllabic words, in which a middle syllable rather than the first or the last is preferred for primary stress assignment. ***Professionalism*** and ***television*** are typical examples of this tendency for stress to be delayed until a further syllable within the word.

5.4 *Stress patterns in disyllabic verbs*

For this group, ***elect, attend, agree, comment, listen*** and ***punish*** were tested.

Stress pattern of *Comment*
Comment showed some inconsistency, in that some of the participants stressed the first syllable, while the majority stressed the second syllable. A total of 18.6%, composed of 16 males and 12 females, assigned stress to the first, thereby realising ***'comment***; while the other 81.3%, made up of 68 males and 44 females, showed preference for the second syllable (***co'mment***). Despite the inconsistency in the pronunciation of the word by NE speakers, no gender variations were observed.

Table 8: Emergence of *co'mment*

Input /'kɒment/ ⟶ Output /kɒ'mɛnt/

	NON-INI	WTS	P SYLL
(i)　　('kɒmɛnt)	*!	*	
☞(ii)　　kɒ('mɛnt)			*

Constraint ranking: NON-INI　>> WTS, P SYLL
Optimal candidate: /kɒ'mɛnt/

Table 8 shows that the stress was on the second syllable of ***comment*** when it used as a verb. The ranking on the tableau indicates that candidate (i) violated two constraints. However, the first violation, which was fatal, eliminated it from being the optimal candidate. Showing the same pattern were ***attend, agree*** and ***elect. Punish*** and ***listen*** were stressed on the first syllable.

　　　From the foregoing, it appears that, in NE, most of the primary stress patterns are similar to SBE patterns. Only a few of the verbs, such as ***comment***, show some Nigerian variation. The example of forward stress in ***comment*** also corroborates earlier findings that Nigerian English has a tendency to delay stress to a later syllable (Kujore 1985; Jowitt 2000).

5.5 *Stress patterns of trisyllabic verbs*

In this section, the stress patterns of trisyllabic verbs are analysed. Five trisyllablic verbs are analysed: ***substitute, preparing, recorded, separate*** and ***considered.***

Stress pattern of *substitute*
For ***substitute***, 25(16.6%) participants stressed the first syllable, while 83.3% of them stressed the third syllable. ***Separate*** was also stressed on the second syllable.

Table 9: Emergence of *substi'tute*

Input /'sʌbstɪtju:t/ ⟶ Output /sɒbstɪ'tju:t/

		TROCH	NON-INI	WTS	ALIGN L
(i)	('sɒbstɪ)tju:t		*!	*	
(ii)	sɒb('stɪtju:t)			*!	*
☞(iii)	sɒbstɪt('ju:t)				*

Table 9 shows that, for this word, candidate (iii) emerged as the optimal candidate because it violated ALIGN L, a lowly ranked constraint.

Constraint ranking: TROCH >> NON-INI >> WTS >> ALIGN L
Optimal candidate: /sɒbstɪ'tju:t/

5.6 *Stress patterns of adjectives*

The stress patterns of adjectives were also tested. **Little**, **serious, difficult, political, democratic** and **unceremonious** were used to do this. All the participants stressed the first syllable of **little** and **Serious**.

Stress pattern for *Difficult*
In ***difficult,*** the primary stress was placed on the first syllable by all the participants.

Table 10: Emergence of *'difficult*

Input /'dɪfɪkəlt/ ⟶ Output /'dɪfɪkɒlt/

		TROCH	NON-INI	ALIGN L
☞(i)	('dɪfɪ)kɒlt		*	
(ii)	(dɪ'fɪ)kɒlt	*!	*	
(iii)	dɪ(fɪ'kɒlt)	*!		*

Constraint ranking: TROCH >>NON-INI >> ALIGN L
Optimal candidate: /'dɪfɪkɒlt/

From the table above, it is evident that candidates (ii) and (iii) were eliminated based on their violation of TROCH. Candidate (i) violated NON-INI, but this constraint was lower ranked than TROCH; consequently, its violation was not fatal.

Stress pattern of *political*
Political was stressed on the second syllable by all the participants. This is shown in the tableau below:

Table 11: Emergence of *po'litical*

Input /pə'lɪtɪkl/ ⟶ Output /pɒ'lɪtɪkæl/ or /pɒ'lɪtɪkæl/

		TROCH	NON-INI	ALIGN L
(i)	('pɒlɪ)tɪkæl		*!	
☞(ii)	pɒ('lɪtɪ)kæl			*
(iii)	pɒ(lɪ'tɪ)kæl	*!		*
(iv)	pɒlɪ(tɪ'kæl)	*!		*

Constraint ranking: TROCH >> NON-INI >> ALIGN L
Optimal candidate: /dɪ'fɪkɒlt/

The table above shows that the violation of NON-INI ruled out candidate (i), since it included the first syllable in its foot. The ranking TROCH >> NON-INI eliminated candidates (iii) and (iv), since they did not have left-headed foot. Candidate (iv) has an epenthetic vowel that is stressed. This is contrary to HEAD-DEP, which makes prosodic head to be input-dependent (Alderete 2004: 219). Only the optimal candidate did not violate one of the constraints that were high ranking in the hierarchy.

With longer adjectives like ***democratic*** and ***unceremonious***, only two stress patterns were observed for each.

Stress pattern of *democratic*
Democratic was stressed on the third syllable by 134 participants (89.3%), while the remaining 16 participants (10.6%) assigned stress to its second syllable. The latter group could be said to be influenced by the root word 'democracy,' whose primary stress is on the second syllable. This implies that this group failed to acknowledge the stress-shifting attribute of the suffix '-ic'.

Table 12: Emergence of *demo'cratic*

Input /demə'krætɪk/ ⟶ Output /dɛmo'krætɪk/

		TROCH	NON-INI	ALIGN L
(i)	('dɛmo)krætɪk		*!	
(ii)	(dɛ'mo)krætɪk	*!		
☞(iii)	dɛmo('krætɪk)			*
(iv)	dɛmo(kræ'tɪk)	*!		

Constraint ranking: TROCH >> NON-INI >> ALIGN L
Optimal candidate: /dɛmo'krætɪk/

Stress pattern of *unceremonious*
Unceremonious, despite being of five syllables, also had only two observable stress patterns: on the first syllable and on the fourth syllable. Thirty-three males and 13 females, totalling 30.6%, assigned stress to the first syllable. A total of 104 (67.3%) participants assigned primary stress to the fourth syllable. The population of those that assigned stress to the first syllable cut across the three tribes and both sexes.

Table 13: Emergence of *unceremonious*

Input /ʌnserə'maʊniəs/ ⟶ Output /ɒnsɛrɪ'monjɒs/

		TROCH	NON-INI	ALIGN L
(i)	('ɒnsɛ)rɪmonjɒs		*!	
(ii)	(ɒn'sɛ)rɪmonjɒs	*!		
(iii)	ɒn(sɛ'rɪ)monjɒs	*!		*
☞ (iv)	ɒnsɛrɪ('monjɒs)			*
(v)	ɒnsɛrɪ(mo'njɒs)	*!		*

Constraint ranking: TROCH >> NON-INI >> ALIGN L
Optimal candidate: /ɒnsɛrɪ'monjɒs/

From the interaction of the constraints, TROCH still maintained its position on the hierarchy. Its violation ruled out candidates (ii), (iii) and (iv). Candidate (i) was ruled out on because it violated the next constraint in the hierarchy, NON-INI.

5.7 Stress patterns of adverbs
Unfortunately and ***temporarily*** were used to test the stress patterns of adverb.

Stress pattern for *temporarily*
Temporarily was stressed on the first and third syllables. Most of the participants –95.9% (144) – stressed the fourth syllable, while the others stressed the first syllable. The few participants that stressed the first syllable could be said to have been much exposed to SBE or were simply exhibiting idiosyncratic tendencies.

Table 14: Emergence of *temporarily*

Input /'temprərəli/ ⟶ Output /tɛmpo'rɑːrɪlɪ/

		TROCH	NON-INI	WTS	ALIGN L	FT BIN
(i)	('tɛmpo)rɑːrɪlɪ		*!	*		
(ii)	(tɛm'po)rɑːrɪlɪ	*!		*		
☞ (iii)	tɛmpo('rɑː)rɪlɪ				*	*
(iv)	tɛmporɑː('rɪlɪ)			*!		
(v)	tɛmporɑ(rɪ'lɪ)	*!		*		

Constraint ranking: TROCH >> NON-INI >> WTS >> ALIGN L, FT BIN
Optimal candidate: /tɛmpo'rɑːrɪlɪ/

Stress pattern of *unfortunately*
Unfortunately was stressed on the first and second syllables: on the first by a minute 1.3% made up of 2 Hausa male speakers, and on the second by the other participants –98.6% (148). This is similar to what was observed in ***temporarily***.

Table 15: Emergence of *un'fortunately*

Input /ʌn'fɔ:ʧənətli/   ⟶   Output /ɒn'fɔ:ʧʊnetli/

	TROCH	NON-INI	WTS	ALIGN L
(i) ('ɒnfɔ:)ʧʊnetli		*!	*	
☞ (ii) ɒn('fɔ:)ʧʊnetli				*
(iii) ɒn(fɔ:'ʧʊ)netli	*!		*	
(iv) ɒnfɔ:ʧʊ('netli)			*!	
(v) ɒnfɔ:ʧʊ(ne'tli)	*!		*	

Constraint ranking: TROCH >>NON-INI >> WTS >> ALIGN L
Optimal candidate: /ɒn'fɔ:ʧʊnetli/

It could be observed that the more the syllables the more the candidates and, sometimes, the more constraints required to explain the emergence of the optimal candidate.

6. Conclusion

NE speakers have a distinct stress system different from SBE. Unlike SBE, where word stress is generally backward, that is, it tends to fall on syllables closer to the beginning of the word (Hyman 1975: 210), NE shows a preference for a more rightward stress. They violate ALIGN L and obey ALIGN R (H, PRWD), an important constraint in placement of tone, particularly with regard to the feature of mobility of tone. It states that "every H tone should be aligned with the right edge of a Prosodic Word" (Yip 2002: 85; cf. Yip 2004: 236; Alderete 2004:220; McCarthy and Prince 2004:170). This is what Kujore (1985) and Jowitt (1991) have called delayed stress. The leftmost edge of a word is usually avoided as much as possible.

Although there were some disparities amongst NE speakers, some stress patterns cut across all tribes, age ranges and educational attainments. One of these is found in their preference for the second syllable in trisyllabic words. The lack of uniformity may have resulted from a number of factors. Some have been reviewed in the earlier studies on NE. In addition to those already identified, the effect of hypercorrection, an attempt to mimic the SBE form, distraction at the point of recording, a need to be different on the assumption that different means better or correct, the consciousness of being recorded, among others are possible causes of the lack of uniformity. Despite these possible causes, there is a predominant pattern, upon which the OT analysis is based, and which does not seem to be peculiar to any of the three linguistic groups.

It was observed that there are no sacrosanct rules that explain even the predominant pattern. However, the following were observed from the data:

1.   Unlike SBE, no syllable is obscure; all have the full forms of vowels.
2.   There was no significant instance of syncope; rather, where such vowel deletion is expected, there is an insertion of a vowel; although the inserted vowel depends on the L1 of the speaker.

3. There was hardly any instance of syllabic nasals. This mirrors some of the segmental properties of the three indigenous languages. Where syllabic nasals were expected to occur, there was usually insertion of a vowel.
4. High pitch is the most important correlate of stress. In SBE stress is a product of pitch change, intensity and duration. But in NE, high pitch is usually sufficient to determine the position of prominence without recourse to the other correlates of intensity and duration. This high pitch is like the high tone of the indigenous languages of the participants. This is in line with Yip's (2002: 85) claim that "there is an affiliation between H tone and stress."

These observations are indicative of the strong influence of the linguistic environment. Recourse to the three indigenous languages, viz: Hausa, Igbo and Yoruba, shows that the major feature of tone that they have in common could have influenced their stress patterns. Gussenhoven (2004) confirms that suprasegmental features, tone inclusive, are susceptible to being acquired in contact situations. He notes that tone is often acquired in a non-tonal language by borrowing or imitation owing to the presence of tone in the broader linguistic environment (Gussenhoven 2004: 42-43). This aptly captures the Nigerian linguistic situation where the interaction of these two independent prosodic features, tone and stress, is inevitable and is evident in the redistribution of stress in NE. The observations above could, therefore, be the direct influence of tone, albeit non-lexical. This means that NE has assimilated some other phonological features of tone besides lexical contrastiveness.

The resultant stress in NE is still free, that is, it is not restricted to a particular position. Despite this, the constraint ranking is consistent for all the words tested: ROOT >> TROCH >> *CSR >> NON-INI >> WTS, PSYLL >> ALIGN L, FTBIN. ROOT is strictly inviolable, being the highest ranked constraint in NE. It is a constraint that demands that every syllable peak must be occupied by a vowel. The non-violability of this constraint makes all syllables in NE to have vowels as their peaks. Followed in ranking is TROCH, which demands that a foot be left-headed. This is then followed by *CSR, which is a constraint that relates to syncope, and NON-INI. WTS and PSYLL are the next; both constraints are mutually unranked. ALIGN L and FT BIN, which follow, are mutually unranked too. The constraint ranking is applicable in the emergence of the optimal candidates in all cases; thus it adequately accounts for the observable stress patterns of NE.

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