Stress peculiarities in sub-variety of Nigerian English (Tiv-English) with gender perspectives

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Abstract
Stress assignment is challenging in L2 situations, especially when the L1 and L2 speakers do not have similar stress elasticity, placement, and timing. The primary concern of this study investigates stress assignment among Tiv-English (TivE) speakers. Such a rare study is available on TivE, unlike other major varieties (Hausa, Igbo, and Yoruba) of Nigerian English (NE) that have widely received scholarly examination; the present study, therefore, delves into a preliminary study on the stress patterns of TivE in word isolation and passage reading with two-five syllable words. A total of 1,822 tokens were produced by fifty (50) Tiv bilinguals from the two public universities. Participants are between 18 and 65 years and satisfy the educated variety of TivE from the two institutions that accommodate Tiv bilinguals as respondents from different parts of Benue State. The audio recordings at 44100Hz were annotated in Praat for stress assignment transcription. Analysis of word stress by isolation and passage reading showed that 84.5% of stress in isolation is similar to other varieties, while 15.6% showed variation. The findings show more similarities than differences in two-syllabic word stress. These patterns were consistently ranked as NSR>>ROOTING>>LHR>>RHR.

Keywords: Tiv-English, stress assignment, tokens, constraint ranking, varieties

1.0 Introduction

Stress is the relative emphasis assigned to certain syllables (by default or deliberately) in words, phrases, compounds, or sentences. In English, stressed syllables are louder than non-stressed syllables. Also, they are longer and have a higher pitch (Dauer, 1983; Nespor, Shukla, & Mehler, 2011; Pamies Bertrán, 1999; Prakash & Murthy, 2016 Roach, 1982). These studies reveal different levels of stress patterns, for example, word, compound, phrasal and sentence stress. Word stress focuses on stress patterns of lexical items ('contract – (n), con'tract – (v) (Amoniyan, 2023; Domahs, Plag & Carroll, 2014; Kelly, 2004; Lieberman, 1960); compound stress underscores stress patterns in compound words (either compound words or compound verbs), e.g., 'TAble lamp', 'silk SHIRT' (Amoniyan, 2020; Bell & Plag, 2012; Kunter, 2011; Ladd, 1984; Plag 2006). Vogel and Raimy (2002) differentiate compounds from phrasal stress when they refer to compounds as Clitic Group (CP) (e.g., 'hot dog) and phrasal stress as a phonological phrase (PPh) (e.g., hot 'dog) (Melefa & Amoniyan, 2020; Richards & Goswami, 2015; Truckenbrodt, 2006; Vogel & Raimy, 2002; Zubizarreta & Vergnaud, 2006). More closely, Atoye, Soneye, Adejuwon, Faleye and Fajobi (2018) describe compounds in three different perspectives, which are hyphenated (brother-in-law), closed (for example, upkeep), and open compound (coal man). Compound words are combinations of pronoun-noun (one-man), noun-noun (house-boy), noun-preposition-noun (brother-in-law), et cetera (Christianto, 2020; Vogel & Raimy, 2002; Zhang, Anderson, Li, Dong, Wu & Zhang, 2010), using hyphens though not all compound expressions have a hyphen, as Atoye et al. (2018) posit. The stress element for compound words (*hyphenated, closed,* and *open*) obeys the Compound Stress Rule (CSR), which dictates that stress is on the first (1st) base of a compound though this rule (CSR) does not apply to all various forms of compound words. However, where CSR does not apply, Nuclear Stress Rule (NSR) does. (Chomsky & Halle, 1968). Akinremi (2020) and Deuber (2021) observe that the distinction between compounds and phrases is notoriously difficult to draw (Soneye, 2019). Lastly, the sentence is any group of words which expresses a complete idea/message. The group of words may include the configuration of content and grammatical words where the content words are stressed (Bresnan, 1973; Erteschik-Shir & Lappin, 1983; Giegerich, 1983; Ng & Chen, 2011). So far, these stress levels (word, phrase, compound, or sentence) have not been investigated in Tiv English. Attention has (always) been paid to the major languages (and ethnic groups) such as Hausa, Igbo, and Yoruba. This serves as a preliminary study on Tiv English, a variety spoken by minority ethnic groups (Benue, Taraba, Nasarawa and Plateau) in Nigeria, and will eventually provide insight into how these speakers of Nigerian English assign prominence to words in wordlist and spontaneous speech and to what extent are the stress patterns closer to Received Pronunciation (RP).

1.1 Tiv English

Tiv speakers are a Tivoid ethnic group with a population of 14 million, approximating 6% of Nigeria's total population (Bohannan & Bohannan, 2017). These people speak Tiv as their first and English or other Nigerian languages as their second language. Their multilingualism is triggered by language contact with Ibibio, Benin, Cameroon, Hausa-Fulani, Igbo and English, the speakers no longer speak Tiv alone to overcome the language barrier in the region (Agber, 2017; Chia, 2013; Harding, 1992; Jockers, 1992; Sokpo, Shittu, Titus T, Udu, & Orban, 2020). This contact has contributed to the spread of the language (Tiv) to different communities leading to central and non-

standard Tiv and has facilitated to the transfer of the Tiv [segment/suprasegment] features to the targeted language (English) which makes the variety unique. Tiv-E is a sub-variety of Nigerian English that Tiv people speak for communication, information, and instruction at home and in public. Tiv-English has received linguistic inquiries with or without comparison with other sub-varieties or major varieties of NE to create a clearer picture of the features of Tiv-E. For example, a few such studies are Aor, 2021; Dunstan, 1969; Ikyer, 2014; Malherbe, 2003, 1931; Mbapuun, 2021; Usar & Ofoegbu, 2017; Waya, 2014. Despite the significance of the identified linguistic inquiries, it is essential to identify that little or no attention has been paid to stress patterns in Tiv-E. These studies are yet to present evident reports about stress placement in Tiv-E, which the current study intends to provide insight into.

2. Stress patterns in Nigerian English

The stress patterns of regional varieties of Nigerian English (NE) have received attention from scholars. The scholars (see Akinola & Oladipupo, 2022; Atoye, 1991; Faleye, 2014; Peng & Ann, 2001; Melefa & Amoniyan, 2019; Sunday & Oyatokun, 2016; Sunday, 2011; Udofot, 2003) had investigated stress patterns in Hausa, Igbo and Yoruba which were regional varieties of NE. Their contributions explained NE with internal varieties. For example, Udofot (2003) described the internal varieties of each regional variety, which indicates non-educated, educated, and sophisticated. For example, Anyagwa (2014) examined the stress patterns of Igbo English speakers. The participants for the main study were randomly selected L1 Igbo-speaking members of the academic and non-academic staff; undergraduate and postgraduate students at the University of Lagos (UNILAG) and Abia State University (ABSU). The data entailed reading transcribed speeches of two RP controls aloud and a spontaneous (controlled) speech on "Life in Nigerian Universities". The data was analyzed statistically, acoustically, and metrically. The statistical analysis involved counting the tokens of occurrence of the variants of the items being tested, converting them into numbers and statistically calculating them to determine their frequency of occurrence. A speech acoustic software (Speech Filing System) was used for the acoustic analysis to establish the exact phonetic correlate(s) of stress on Igbo English (IE). However, because the various recordings were not done in a sound-treated room, the problem of ambient noise was encountered. Therefore, the measurements were restricted to duration and Fundamental frequency (f0). Pitch modulations were established as the primary phonetic cue to stress in IE. For the metrical analysis, a clause was selected from each RP control and analysed metrically alongside its realizations by the Igbo subjects. These metrical patterns reveal that a significant source of divergence in the metrical patterns of the IE and RP utterances is the total absence of vowel weakening in IE's rendition. Thus, it was concluded that while vowel strength is generally significant for IE, its significance for RP is tied to its (non-) occurrence in the stressed syllable (Mustapha, 2004).

Similarly, Melefa and Amoniyan (2020) accounted for the similarities and differences in phrasal stress placement in educated Igbo and Yoruba English using Optimality Theory (OT). The study also discussed how these patterns relate to or differ from Standard British English. A specially prepared text was read by sixty (60) educated Igbo and Yoruba English speakers randomly selected from the University of Ibadan and the University of Nigeria, Nsukka, respectively. The sixty participants (30- University of Ibadan, 30- University of Nigeria) from these universities represent southwest (for Yoruba) and southeast (for Igbo), Nigeria. The data collected was

analysed perceptually, theoretically, and statistically. Descriptive statistics of simple percentage using SPSS was employed to calculate the occurrences of tokens, and chi-square was used to check the significance levels between the phrasal stress patterns in Educated Igbo English (EIE), Educated Yoruba English (EYE) and SBE at 0.05. Sound Forge version 13.0 and Praat version 6.0 were used for processing the speech files and the acoustic analysis, respectively. The findings revealed variations in the patterns of stress placement in phrases by educated Igbo and Yoruba speakers of English, which means that the two accents of Nigerian English belong to the southern part of Nigeria but were not entirely the same. The results showed a significant difference from RP. The patterns of stress assignment to phrases in educated Igbo and Yoruba accents of English were generally unstable and sometimes unpredictable and findings showed that 70.45% of educated Igbo and 80.95% of educated Yoruba speakers of English assigned prominence to the leftmost lexical item for noun phrases (satisfying LHR), while 70% of educated Igbo and Yoruba speakers of English assigned prominence to the main verb in verb phrase constructions, which conformed to RP. The study concluded that the patterns of phrasal stress assignment in EIE and EYE were significantly different from SBE, although there were certain similarities (Akindele, 2020; Peng & Ann, 2001).

More recently, Adegbembo, Jayeoba, and Akinwale (2021) investigated the stress placement on English words by Yoruba Nigerian English Speakers. The study also assessed the vowel production in typically unstressed syllables of English words, which would require a shift of stress and a consequent reduction of vowels. Twenty Yoruba English Speakers read a text comprising five different exercises. The data analysis underpined various sounds produced where the weak forms of English were expected. The data analysed were converted to percentages, and the higher percentages were regarded as the norm. The findings discovered that Yoruba English speakers could hardly draw a line between the strong and weak forms of the English syllable in English since the schwa sound, considered the weak sound of English, was absent in the Yoruba sound system. The findings explained that educated Yoruba English substituted the schwa sound for a strong vowel such as /a/ or /a:/. Also, it was observed that the indigenous language's consonant-vowel (CV) structure was responsible for inserting a corresponding vowel(s) into syllabic consonants. The study discovered Yoruba English speakers' inability to produce the schwa sound affected their stress patterns because the unstressed vowel significantly determined stress placement in English syllables. Without the schwa, speakers might have fewer options for unstressed syllables, or would realise every syllable as heavy. It was important to note that the effects of not producing the schwa could vary depending on the specific phonological patterns under investigation. The language interaction between English and Yoruba showed that while the schwa sound is a common feature in English, it might not be present or as prominent in Yoruba, leading to different effects on stress patterns among educated Yoruba English speakers.

No doubt, insights on educated Tiv English have been insufficient; meanwhile, the ongoing codification of NE requires research outputs in major and sub-varieties of NE. Similarly, as earlier highlighted, previous studies suggested the need to research more on NE's sub-varieties (e.g., Tiv English). Therefore, this study not only focused on educated Tiv English but also equitably compared the stress patterns in wordlist and passage reading; Tiv English and Standard British English (SBE), with theoretical implications on the variety. In conclusion, researching sub-ethnic varieties (Tiv English) of NE are crucial for a comprehensive understanding of the NE's linguistic landscape and varieties dynamics. This research is necessary to inform various fields,

including linguistics, sociolinguistics, education, and policymaking, leading to more inclusive and culturally sensitive practices to celebrate diversity in NE.

3.1 Methodology

The study investigates stress peculiarities in 2-5 syllables among educated Tiv-E speakers. The study examines the Tiv dialect as an L1 at two higher educational institutions (federal and state) of learning: the Federal University of Agriculture, Makurdi (FUAM) and Benue State University (BSU). The two institutions accommodate Tiv bilinguals as respondents from different parts of Benue State, where the dialect is widely spoken. The study population comprised fifty (50) participants, i.e., 25 respondents each from FUAM and BSU for the wordlist reading meanwhile only 23 (11 male, 12 female) participated in the passage reading. The participants included final-year students and the staff (academic and non-academic staff) of the two institutions selected. The speakers recruited for the study were given a piece consisting of the tokens in the wordlist and passage reading. Both readings were analysed to identify if context affects stress placements. After that, descriptives and inferential statistical analyses were run in R version 4.2.3. These speakers (11 male and 12 female) belong to an educated variety of sub-varieties of Nigerian English, as classified by Udofot (2003). All the respondents for both data collection satisfied Udofot (2003) because they are either graduates or at the penultimate stage of their academic programmes, and the information about their social class was not requested Though they are proficient in their L1, they are expected to have learnt and are proficient in English for national and international intelligibility with these education levels. The use of these human participants has the approval of the Faculty of Arts Research Ethics Committee, University of Nigeria, Nsukka. I collected the data during my master's degree at the University of Nigeria between 2018 and 2020. A total of 1,822 tokens in wordlist (500) and passage (1,322) reading by TivE speakers was produced with a sampling frequency of 44100Hz. In all, the wordlist has 10 words, and the passage reading has 24 targeted words. After the recording, the audios were annotated in Praat version 6.1, and the _ProsodyPro (version 5.7.8.7) by Xu 2021 was used to elicit the raw data for analysis. The script has a spectral centre of gravity (CoG), median_pitch (Hz), intensity (dB), and duration (ms). The tokens for word readings vary from two to three syllables, but the passage reading has two to five-syllable words (Table 1-2). The tokens were produced and recorded after the participants consented to participate. The participants' sound productions were analysed statistically and acoustically through Praat. For primary stress, pitch, intensity, duration, and center of gravity (CoG) were explored to determine reliable cues for stress placement in TivE. To further discover the variation within the variety and the similarity with other varieties such as British English, Jones' 8th Edition Cambridge English Pronouncing Dictionary served as a baseline for word reading. The cognitive interplay in stress placements was theoretically discussed from a constraint-oriented perspective.

Table 1: Tokens for the wordlist

Tokens for Wordlist		
Condemn (v)	Conform (v)	Composed (v)
Singing (n)	Driving (n)	Complain (v)
Hunger (n)	Produce (n)	Thinking (n)
Comfort (n)		

50 participants*10 tokens = 500 tokens for the wordlist

Table 2: Tokens and frequency of passage reading.

argue	argument	conspirational	consumed	contest	counting
34	80	107	49	46	46
customers	engaged	forehead	forget	happening	licence
69	44	90	10	69	42
money	operation	parlour	pepper	previous	promptly
42	92	44	88	64	38
rainbow	resume	silently	sitting	violently	whisper
2	44	60	44	72	46

24 tokens with varied syllables and frequency

Table 3: Stressed syllables and frequency of passage reading

Syllables	n
1	537
2	533
3	169
4	63
5	20

3.2 Optimality theory

Optimality theory was propounded by Carstairs-McCarthy (2008); Kager Pater & Zonneveld, (2004); Prince and Smolensky (2004, 1993, 1991); ; Tesar & Smolensky (1998). The theory (OT) is applicable for analysing any language and every language through generated constraints. For the significance of this paper, OT is interested in prosodic properties that satisfy certain constraints on the tableau. Meanwhile, the language and the aspect of the language under consideration determine the constraints employed to rank the candidates to select the winning candidate with an indication of hand ☞ (McCarthy, 2008). The design of OT has three (3) mechanisms, where CON is the component that define the set of universal violable constraints; GEN is the component where output candidate parses are composed and generated based on input forms; and EVAL is the component that selects an optimal output from the set of alternative candidates, given a language-specific hierarchical ordering of CON. The schema is presented below:

[INPUT] ⟶ GEN ⟶ EVAL (CON) ⟶ [OUTPUT]

McCarthy (2002) posits that constraint ranking is paramount in the grammar that is language. They interact with the possible candidates that are composed and generated by the GENERATOR, which are subject to evaluation by EVALUATOR. Constraints have three (3) significant structures: markedness, faithfulness, and alignment constraints. The diacritics for constraints ranking are the asterisk (*), which connotes (partial/mere) violation, the asterisk with exclamatory mark (*!) stands for fatal violation, and any candidate that incurs fatal violation is deleted; the arrow forward / greater than sign (>>) indicates mutual constraints ranking scale from the high-ranked constraints to the low-ranked constraint families. A pointing finger (☞) indicates the optimal/winning candidate after satisfying all the arranged constraints on the tableaux. Constraint ranking is; thus, Markedness >> Faithfulness >> Alignment, having Markedness as the most ranked constraint.

Markedness constraints are blind to input structure and assign violation marks to candidates based solely on its output structure, without regard to its similarity to the input. That is, markedness (well-formedness) constraint evaluates output structure(s) only, penalizing and minimizing the presence of specific configuration(s). The hallmark of markedness constraints which rank above faithfulness constraints, considers the discrepancy between the input and output (structurally). It requires the output candidate to have some 'optimal' shape with a likelihood with the input. Faithfulness constraint requires the output not to differ unnecessarily from the outputs. However, the constraint keeps the markedness constraints in balance. Faithfulness constraints require that the output of the phonology must resemble or even be identical to its input; if different, such a candidate violates the faithfulness constraint(s). Alignment constraints describe the tendency in languages for certain linguistic features to coincide.

3.2.1. Constraints highlighted for the present study

Markedness Constraints

NSR (Nucleus Stress Rule): stress the rightmost elements in the word (Sunday & Oyatokun, 2016)

GER (Grid Euphony Rule) depicts that every strong lexical item should be followed by a weak position, and no weak lexical item should be preceded by more than one weak position.

ROOTING: content words must be stressed (Hammond, 1997, p.44; Sunday & Oyatokun, 2016).

Faithfulness Constraints

PAPR (Pitch Accent Prominence Rule) pitch accent lexical items receive an additional beat to raise its prominence.

Alignment Constraints

TGA (Text-to-Grid) alignment relates to the lexical structure of either TGA (L), TGA (M) or TGA (R) (Selkirk, 1984).

RNR (Right-node-raising): stress the lexical item at the right hand of the lexical configurations.

LHR (Left Head Rule) emphasises that stress should be at the leftmost.

RHR (Right Head Rule) emphasises that stress should be at the rightmost.

4.0 Data Presentation

Table 4:1 Stress patterns in word isolations in Tiv-E[1]

Lexical Items	1st Syllable (%)	2nd Syllable (%)	Closeness to RP
Condemn(v)	26%	73%	73%
Conform(v)	20%	80%	80%
Composed(v)	14%	86%	86%
Thinking(n)	100%		100%
Singing(n)	100%		100%
Driving(n)	100%		100%
Complain(v)	33%	66%	66%
Comfort(n)	73%	26%	73%
Hunger(n)	100%		100%
Produce(n)	80%	20%	80%

[1] v- verb; n – noun; adj – adjective; adv – adverb

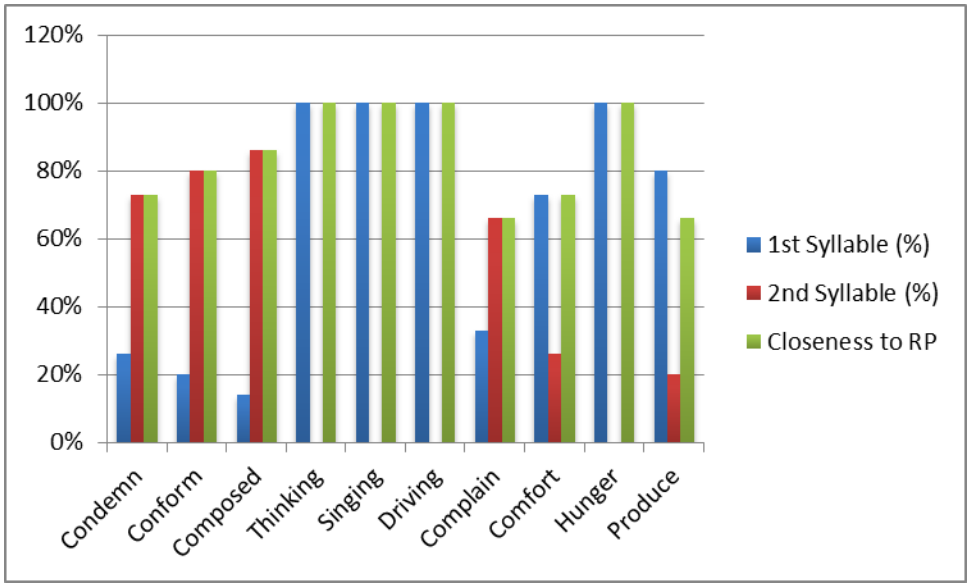


Figure 1: Chart representing stress patterns of speakers of Tiv-E in isolation

Table 5: Stress patterns in spontaneous(passage) reading in Tiv-E

Tokens	**1st Syll**	**2nd Syll**	**3rd Syll**	**4th Syll**	**5ft Syll**	**Closeness to RP**
Licence (n)	65%	35%				65%
Argue (v)	29%	70%				70%
Argument (n)	60%	32%				60%
Consumed (v)	12%	88%				88%
Contest (n)	82%	17%				82%
Counting (verb)	8%	91%				8%
Customer (n)	68%	20%				68%
Engaged (v)	31%	68%				68%
Forehead (n)	91%	8%				91%
Happening (n)	82%	8%	8%			82%
Money (n)	81%	19%				81%
Operation (n)	44%	16%	20%	20%		44%
Parlour (n)	90%	10%				90%
Pepper (n)	60%	40%				60%
Previous (adj)	73%	8%	17%			73%
Promptly (adv)	52%	47%				52%
Rainbow (n)	50%	50%				50%
Resume (v)	13%	86%				86%
Silently (adv)	14%	42%	42%			14%
Sitting (verb)	40%	59%				40%
Violently (adv)	22%	66%	11%			22%
Whisper (verb)	39%	61%				39%
Conspirational (adj)	7%	7%	21%	28%	33%	21%

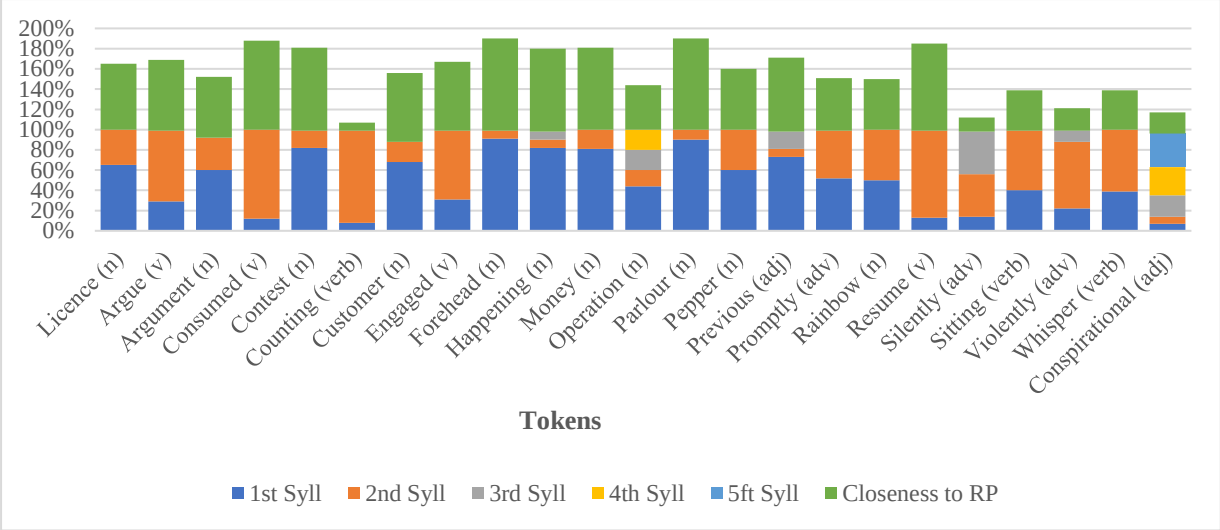
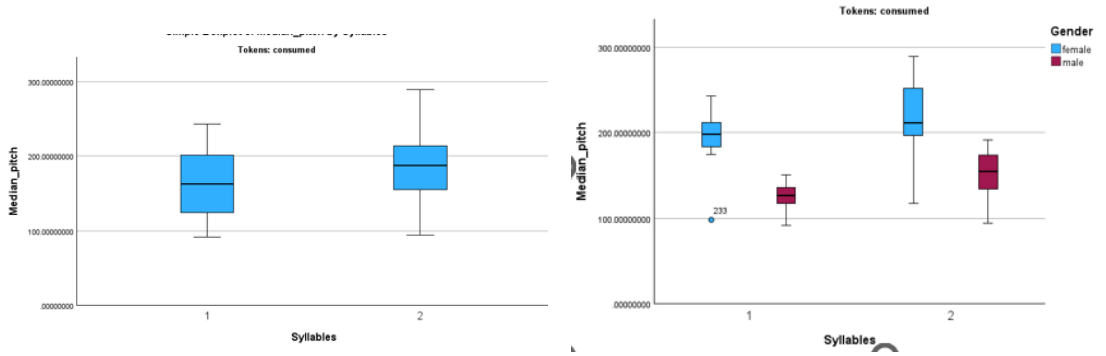


Figure 2: Chart representing stress patterns of speakers of Tiv-E in passage reading

In wordlist (isolation) reading, Tiv English speakers (TES) are 95.16% (n) and 76.25% (v), similar to SBE form in two-syllable words for nominals and verbs accordingly. Meanwhile, in spontaneous speech, the TES are 72.83% (for nouns) and 77.42% (for verbs) closer to SBE in two-syllable words. For three-syllable words that are nouns/adjectives and adverbs, the TES are 70.75%(n/adj) and 29.3% closer to the SBE (Figures 1, 2). The stress placement on the fifth syllable by the majority (33%) in five-syllable words shows that only 21% of the speakers who assign prominence to the third syllable from the end are closer to the SBE in this regard. The findings reveal a stronger correlation in the stress placement of two-syllable English words than three or more-syllable words, but I discovered that as the number of syllables increases, the stress patterns become more dissimilar between the two English varieties.

4.2: Stress patterns in isolation and passage reading in TivE

The stress patterns of two-syllable words in passage reading trigger stress alternation, where the primary stress is either on the first or second syllable. The tokens such as *argue, consumed, contest, counting, engaged, forehead, forget, licence, money, parlour, pepper, promptly, resume, sitting,* and *whisper* have two syllables. The lack of consistency in stress patterns of two-syllable words among the speakers indicates the complex interplay between their native tonal language and the stress patterns of English. The findings show no significant difference in pitch and gender for *contest, promptly, resume, whisper* and *sitting*; but other 2-syllable tokens show significant differences by pitch and gender. For two-syllable words, COG, pitch, and intensity provide insights into the stress peculiarities in TivE (Figure 3, below). The findings show primary stress on the first syllable of *forehead, licence, money, parlour, pepper, promptly, sitting* while *argue, consumed, engaged, forget,* and *whisper* has stress patterns on the second syllable. The latter conforms to the word stress patterns of verbs. However, three tokens have 50% stress placement for the first and second syllables in *contest, counting,* and *resume*. The stress alternation in *contest, counting,* and *resume* suggests that the participants were not conscious of the word stress of the latter group in the passage.



i ii

Figure 3(i&ii): stress peculiarities (pitch vs gender) for two-syllable words in TivE

The 3-syllable words in TivE show different patterns where the speakers assign prominence to the first, second and third syllables. Though the initial of these tokens has varied syllable components (ha-, cus-, si-, ar-), there is a consistency of the first syllables being stressed by the speakers. The findings do not reveal any significant difference by gender in stress patterns. Primarily, the pitch difference in both genders (Figure 3ii) shows that both genders do not have similar pitch heights, as women have higher pitch values than men. Four phonetic cues (pitch, intensity, centre for gravity, duration) were checked to determine the stress peculiarities (Figure 4). Results show pitch, COG, and intensity as reliable cues to determine stress peculiarities in *customers*, *happening*, *silently*, and *argument*. The peculiarities show that the first syllable is pronounced with primary stress.

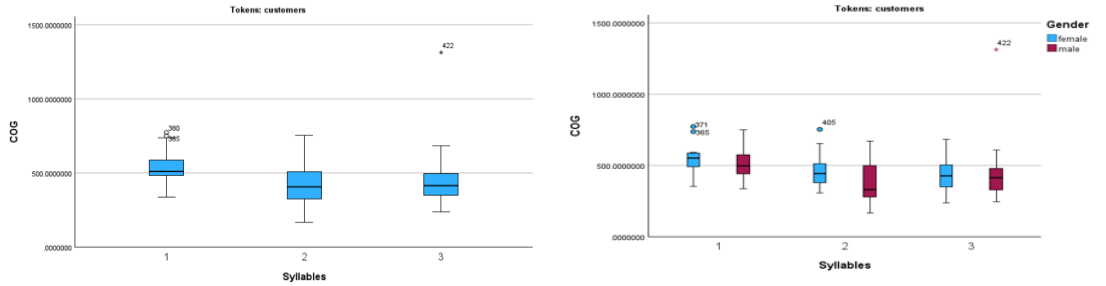
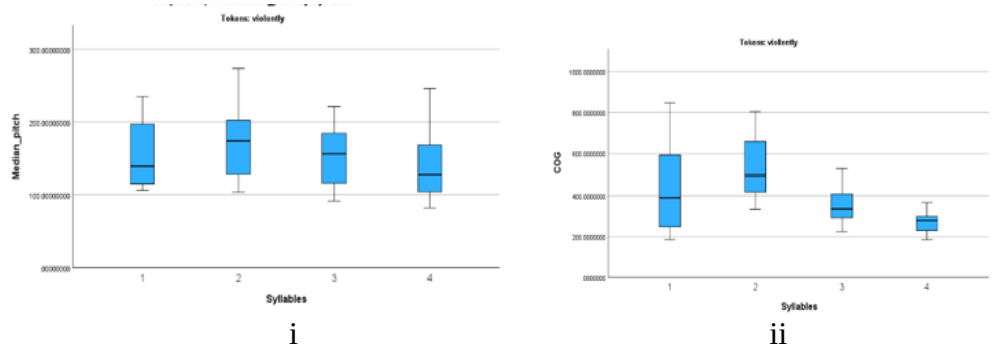


Figure 4: Stress peculiarities for 3-syllable words in TivE

This shows that duration is the least to consider in the stress patterns of TivE. The statistical results show a significant relationship between COG and stress of three-syllable words ($p<2.86e-13$). This result is similar to pitch ($p=0.001$), which explains a significant effect of pitch ($p<2e-16$). This suggests that the pitch and COG contribute to the significant difference between COG and pitch. This result is 59% reliable, and the overall interaction reveals a p-value of 1.78e-12. However, there is no significant relationship between intensity and duration patterns as $p>0.05$. To determine the stress patterns of 4-syllables, pitch, intensity, duration and COG reveal pitch, COG, and intensity as reliable cues for various stress patterns. For example, Figure 4 shows that the third syllable of the four-syllable words receives prominence; meanwhile, this insight contradicts pitch, COG, and intensity. When duration in other stress patterns of different syllable structures is considered, it is discovered that duration is unreliable for stress determinants in TivE. For example, the word *violently* has prominence on *lent* (Figure 5i-iii).



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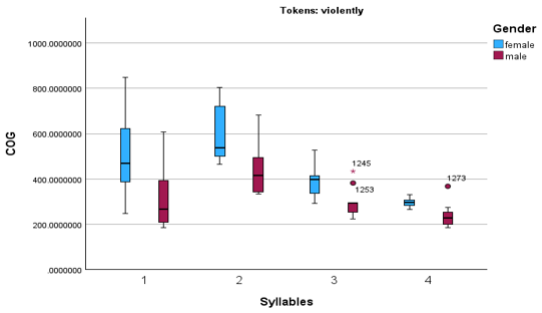

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Figures 5i-iii: stress peculiarities of 4-syllable words in TivE

The stress pattern in four-syllable words shows differences by gender. The female shows a higher acoustic energy spread for the second syllable, which correlates with pitch, intensity, and COG. The statistical results show a significant relationship between COG and stress of four-syllable words ($p<7.43e-05$). This result is similar to pitch ($p<1.34e-08$). This suggests that the pitch contributes to the significant difference between COG and pitch. This result is 48% reliable, and the overall interaction reveals a p-value of 3.842e-11. However, duration patterns have no significant relationship as $p>0.05$ (0.9017). Words with five syllables are tested, and the results show that pitch, COG, and duration determine prominence. Consistently, COG and pitch determine stress patterns in TivE (Figure 5, 6).

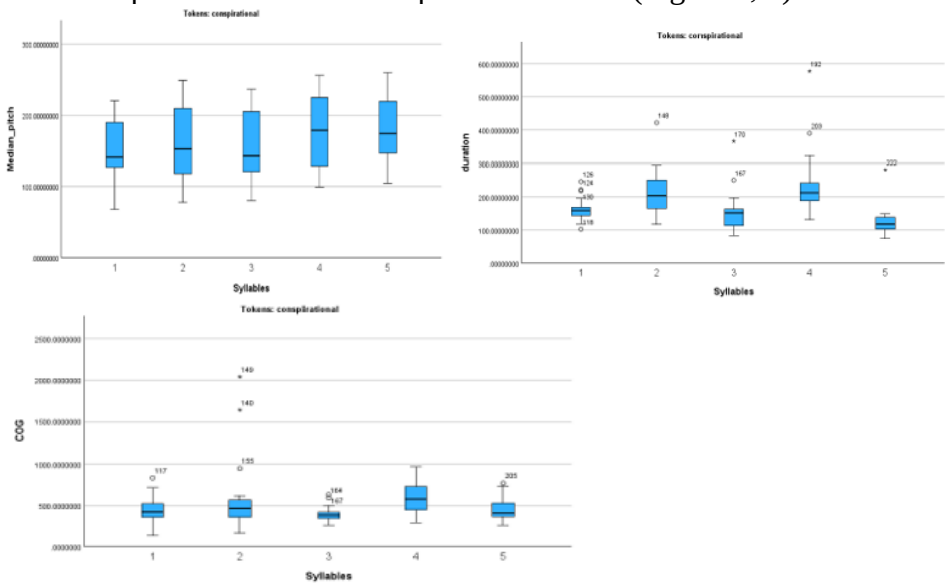

Figure 6: Stress patterns for 5-syllable words in TivE

The results for five-syllable words by COG and intensity show a significant relationship ($p<0.05$). Other cues, such as duration and social variables, do not show any correlation for determinants.

4.3 Comparison of stress patterns in word isolation and passage reading in TivE

Stress patterns of words in isolation or connected speech do not have absolute stress placement without alternation, especially in passage reading. In the word reading, tokens such as *singing, driving,* and *thinking,* with -ing suffix, have 100% primary stress on the first syllable. Meanwhile, three tokens in the passage reading have -ing suffix for two and three syllables. The findings show variance in the primary stress. For example, *counting* (as an adjective) has 50% first and second syllables. The participants assigned stress to the base and suffix forms. In contrast, *happening* its primary stress on the first, although less than 30% stressed the second syllable. The variance in the stress patterns of 2 syllable words in the passage reading suggests that stress placement varies by speech task among TivE speakers. The context can also influence the stress pattern of a particular word. For example, in connected speech, stress patterns can be influenced by syntactic structure, sentence rhythm, and semantic constraints. This contextual variation can contribute to differences in stress placement during passage reading compared to isolated word reading. Also, variance in stress patterns between word reading and passage reading can be attributed to the nature of the tasks. Word reading typically involves focused attention on individual words, allowing participants to apply stress patterns consciously that they are familiar with. Passage reading, however, requires a more natural and fluent reading style, where stress patterns may be influenced by prosodic phrasing and overall sentence rhythm. Moreso, variance in the primary stress patterns of two-syllable words in word reading and passage reading can arise from individual differences, language-specific rules, lexical properties, contextual effects, and task-specific factors. These factors shape how individuals perceive, produce, and apply stress patterns, leading to variability across participants and reading tasks.

4.3 Statistical Discussion

The pitch, intensity, duration, and COG interactions are further explored in regression analysis as stress determinants in TivE. For example, fitting pitch, tokens, syllables, and gender for the stress patterns of the variety, the results show no significant effect by syllable of prominence ($p>0.05$) but establish a relationship by gender ($p<2e-16$). The tokens that significantly differ in primary stress by pitch include *argue, argument, contest, customers, engage, happening, parlour, pepper, resume, silently, sitting* and *violently* while *conspirational, consumed, counting, forehead, forget, licence, money, operation, promptly, rainbow* and *whisper* indicates no relationship. More closely, *sitting* shows a significant connection with stress placement for passage reading and has 100% unanimous primary stress in word reading. This suggests that TivE speakers are sensitive to the context of stress placement. The subsequent inquiry bothers on the consistency of this claim in speech styles because *counting* and *sitting* function as adjectives in the passage, yet they do not have a similarly significant effect. A post hoc analysis shows the contributory roles of gender and syllable towards the significant difference. When gender and syllable are removed from the model, the frequency of the significant tokens drops from 12 to 4.

Meanwhile, these results differ in duration. The results indicate lesser significant differences across the tokens. Unlike by pitch, which has 11 tokens that are not

significantly different, the duration shows only 7. Thereby, the number of the very different by pitch rose to 15. Surprisingly, the tokens with significant effect do not discriminate by syllable complexity. However, I perceive from the analysis that the length of the syllable structure often determines duration more than the primary stress pattern. Similarly, it is observed that duration is not a cue for primary stress patterns in TivE. The results by gender reveal no significant relation, as the p-value is greater than 0.05.

Considering the tension between pitch and duration in determining primary stress in TivE, it is noteworthy that the variety has tonal backgrounds where the pitch of a syllable carries lexical or grammatical meaning, but the duration may play a relatively insignificant role in determining stress patterns. It is assumed that the primary cue for distinguishing syllables and conveying meaning is the pitch or tone contour of the syllable. The pitch variation carries more weight in perception and is a stronger cue for conveying lexical distinctions. As a result, the duration of syllables may have less influence on stress patterns than the pitch/tone pattern. However, though duration may play a relatively insignificant role in stress patterns in TivE languages, it can still contribute to its prosodic features. Additionally, the relative importance of duration and pitch/tone may vary across different tonal languages and specific dialects within those languages.

Stress patterns are typically determined by different factors such as syllabic structures, lexical or morphological factors and phonetics characteristics. In this analysis, I discovered that COG provides insights into a phonetic configuration, such as intensity, duration and different spectral properties related to stress patterns. The model significantly differs between stressed and unstressed patterns across tokens ($p<2.2e-16$). This inferential result is similar in syllables and gender. This suggests we take insight from COG to complement intensity and duration, especially in studying varieties of English that rarely have absolute cues for stress determinants.

Of course, primary stress refers to the emphasis assigned to certain syllables in words. Though duration, COG and pitch have revealed a contributory role in determining stress placements in TivE, intensity also helps differentiate stressed from unstressed syllables. However, if the stress patterns of words evenly distribute the intensity across syllables, or if the stressed syllables are not significantly louder than the unstressed syllables, it can lead to similar intensity levels in different syllables. The finding in this study shows no interaction by syllables ($p>0.05$) when intensity, tokens, syllables, and gender are modelled. This suggests that the syllable structures do not constitute or determine aerodynamics across the syllables of 2-5 words. The statistics reveal only eight tokens that are not significantly different in stress determinant with $R^2=0.14$ (14%) and the $p<2.2e-16$.

So far, the analysis reveals a tonal transfer where the pitch of a syllable carries lexical or grammatical meaning, and duration plays a relatively insignificant role in determining stress patterns. It is assumed that the primary cue for distinguishing syllables and conveying meaning is the pitch or tone contour of the syllable. The pitch variation carries more weight in perception and is a stronger cue for conveying lexical distinctions. As a result, the duration of syllables may have less influence on stress patterns than the pitch pattern. However, though duration may play a relatively insignificant role in stress patterns in TivE languages, it can still contribute to its prosodic features. Additionally, the relative importance of duration and pitch may vary across different tonal languages and specific dialects within those languages. In this study, I discovered that COG is also reliable for stress determinants in TivE. Consistently, COG, pitch, and intensity are more reliable than duration in stress

placement in TivE. Studies on varieties of Nigerian English (NE) have not explored COG as a cue to investigate stress placement in NE. Also, the results further show gender differences in the minimum and maximum COG. This suggests that though there is no significant difference by gender, both genders do not have a similar COG, and the difference in the COG between males and females in stress peculiarities is primarily attributed to anatomical and physiological factors, particularly vocal tract size and length because males typically have longer vocal tracts compared to females. The length of the vocal tract, including the pharynx, oral cavity, and other vocal resonating spaces, influences the resonant frequencies and formant frequencies produced during speech. The longer vocal tract and thicker in males leads to lower resonant and formant frequencies than in females. These anatomical and physiological differences contribute to variations in the acoustic properties of the vocal output between males and females. These factors influence the centre of gravity in phonetics, associated with the overall spectral distribution of energy in the voice. Specifically, males' longer vocal tracts and larger vocal folds result in a lower centre of gravity than females, leading to a perceptually lower and more "bassy" voice quality in males. And similarly, intensity plays a role in the loudness stress patterns. However, while intensity plays a crucial role in our perception of sound, it does not directly determine words' primary stress or emphasis. Thus, intensity can contribute to our perception of stress or emphasis in speech, it is not the sole determinant. A particular language's phonological rules and patterns govern the primary stress patterns in words.

4.4 Theoretical Discussion

Stress patterns are analysed in this section. First, the word *condemn* denotes giving someone a severe punishment after deciding they are guilty of a crime as a verb. The word has six sounds or two syllables with alternate stress patterns (first or second) among the respondents. The results of the speech rendition explain that the categorization of stress patterns is two. The stress placement is either assigned to the initial (first) or latter (second) syllable. No respondent assigned prominence to the duo syllables as tonal despite the respondents' tonal background. Perceptual analysis reveals that 26% and 73% of the respondents assign prominence to the initial and latter syllable accordingly.

The result further reveals that the category of the respondents who assign prominence to the initial syllable is not aware or has forgotten that *con* in *condemn* is a prefix that can be inflected with numerous base forms. Prefixes are groups of letters that are added to the beginning of a word to change its meaning and make a new word which does not receive strong stress in English. The result, no doubt, explains that 73% of the respondents who assign prominence to the latter syllable are like the RP and American English (AmE). It implies that the cognitive processes of RP, AmE and Tiv-E are similar by 73%. Tableaux 1 below illustrates the stress patterns as outputs in Tiv-E from the common input.

Tableaux 1: Condemn

INPUT: /conˈdemn/ ⟶ OUTPUT:/conˈdemn/

Candidates	**NSR**	**RHR**
☞/con.ˈdemn/		
/ˈcon.demn/	*!	*

Keys: **NSR**: Nucleus Stress Rule

RHR: Right Head Rule

Constraints Ranking: NSR>>RHR

Optimal Candidate: /con.ˈdemn/

In OT, the two patterns as outputs are considered as the possible input sets among the respondents of Tiv-English. For these inputs, the constraints of NSR and RHR reveal the cognitive processes that produce the inputs. Theoretical perspective has revealed similar cognitive orientation of the respondents in relation to other varieties of English.

Acoustic evidence supports perceptual and theoretical analysis. The acoustic properties of the initial and latter syllables vary. The results favour a common (most preferred) stress pattern assigned to the right to satisfy RHR rather than the left. The pitch, intensity and duration correlate with interpreting that the latter syllable is heavier than the initial syllable in the token.

Similarly, the results in the speech production for *condemn* are repeated in *conform.* The realization of the token indicates that most speakers of Tiv-E grasp the knowledge of stress patterns that characterize *conform*. The input as well generates two outputs. The first output has prominence on the first syllable; the second output assigns prominence to the second syllable. However, the % of respondents who assign prominence to the second syllable is 80%, while only 20% assigns prominence to the first syllable. The result reveals that the tonal structure of the respondents' MT has little or no influence on the response. For instance, if the respondents have assigned prominence to the two syllables without rendering one as weak and another as strong, one would conclude that the effect of MT determines prosodic structure in Tiv-E. Notwithstanding, if the respondents are familiar with only one language, there is the possibility that the respondents may have had single articulation that is directly equivalent to the output. The number of the L1 of respondents directly affects their speech production.

So far, the results have established that the respondents often assign prominence to the right hand of words rather than to the left. This is related to the findings of Melefa and Amoniyan, 2020 & 2019. Another scholar like Kujore (1985) refers to it as delayed stress without cognitive and empirical evidence. Through OT orientation, one could deduce that sub-varieties of Nigerian English have RHR alignment. This alignment is becoming a characteristic feature of Nigerian English, as discovered by Sunday and Oyatokun (2016). However, the minute percentage (i.e 20%) of the respondents who assign stress to the first syllable describes that Tiv-E does not have an absolute homogeneity in relation to other varieties like RP, however, despite the varied outputs, 80% of the respondents that assign prominence satisfies RHR are parallel to RP and AmE.

The constraints ranking for the token (*conform*) are NSR and RHR. NSR explains that a word's rightmost element(s) receives prominence. The first output (as '*conform*) fatally violates NSR, disqualified, while the counterpart stress pattern satisfies the markedness constraint. Secondly, the PAPR constraint explains that pitch accent lexical items receive an additional beat to raise their prominence. It shows that the stressed syllable has a higher pitch range than the unstressed syllable. Since the first output has PAPR on the first syllable, it nullifies the candidate assuming an optimal candidate. The second output (*con'form*) fulfils first and the second markedness and faithfulness constraints, respectively. The findings identify a common prosodic feature for the stress pattern of *conform* among the respondents of Tiv-E.

Also, duration patterns support that the respondents have a longer duration for the second syllable that receives prominence by 80% of the respondents than the counterpart with a stress pattern by 20%. Precisely, *con* in *conform* has an average of

20ms, while *form* in *conform* has an average of 30ms. One of the acoustic cues of stress placement is duration patterns. It emphasized that the stressed syllable should be longer in duration than the syllable that has a weak syllable. The duration patterns for *conform* revealed that Tiv-E has an average of 40ms for the token.

The word *compose* or *composed* is not strange to the speakers of Tiv-English; many Tiv speakers are familiar with different kinds of songs and for other purposes (see Babalola & Taiwo, 2009; Sylvanus, 2018). Therefore, the stress patterns for *composed* is tested among the respondents, and the results correspond to token 1 and 2 (above). It is assumed that the stress patterns of familiar works are liable to be more similar and uniform than unknown words. Likewise, studies have discovered that Nigerians tend to assign prominence to words of few syllables in consonance with RP than words with 5-7 syllables. Specifically, 86% and 14% of the respondents assign prominence to the second and first syllables, respectively. The 86% of the respondents that assign a syllable to the second syllable are conscious and conversant with the stress patterns in RP. It further explains that 86% of every 100% of respondents in Tiv-E assign prominence to the second syllable in *composed*. The 14% of the respondents who assign prominence to the first syllable (not the same as to the RP) have shown that two varieties of English may never be analogous without a difference. The difference establishes that each variety of English has unique characteristic features that differentiate it from other varieties of English. Closely, the difference explains the concept of socio-phonetics, where the sociocultural background of the respondents provides insights into determining variables of the respondents' speech production.

The pitch variance helps identify the relationship between the stressed and unstressed syllables. For example, the unstressed and stressed syllables range from 100Hz to 150Hz and 151Hz to 200Hz, respectively. The results are based on the scientific analysis as revealed in Praat. Meanwhile, the pitch values are considered relative to neighbouring pitch accents for syllables to identify stressed and unstressed syllables properly. In an instance where the pitch values of a respondent are low by default, there is a need to evaluate the pitch values of unstressed in relation to stressed for juxtaposition.

The duration patterns for *posed* in *composed* is longer than *com* in *composed* for different acoustic reasons. It is insufficient to claim that *posed* had longer timing than *com* because it received prominence. Far from that, the phonemic component of *posed* is more than for the *com*. However, the present study does not frown at duration as a criterion for stressed and unstressed syllables. Thus, duration cannot measure and determine stressed and unstressed syllables in TivE.

Furthermore, stress patterns in words that end with *ing* and *-er* clearly identify that the respondents of Tiv-E are aware of stress patterning in suffixation. The RP recommends that suffixes should not receive prominence; rather than assigning prominence to the suffix, there should be a shift to the free morpheme. That is, stress patterns in RP are not fixed but free (cf. Melefa & Amoniyan, 2020, 2019; Sunday, 2016, 2010). From the foregoing, it requires conscious learning of stress patterning for accurate stress patterns in RP among the speakers of English as a second and foreign language lest the effect of the mother tongue language affect the stress patterns of the targeted language.

Tokens like *thinking*, *singing*, *driving* and *hunger* have prominence on the first syllable, according to RP. The results are identical among the respondents for the study, as 100% of the respondents appropriately assign prominence. This aligns with Banjo's (1997) position that educated speakers of English in Nigeria are close to BrE.

It indicates that the respondents are familiar with the stress pattern of words with *-ing* as a suffix.

Theoretically, the stress placement among the respondents supports ROOTING and LHR constraints, unlike the study by Melefa and Amoniyan (2020), which mentions a sub-variety of Nigerian English, like Igbo English, has stress alternation. The study also explains that Yoruba English often assign prominence that satisfies LHR, though Igbo and Yoruba English have higher similarities to the RP than differences.

Tableau 2: Thinking, Singing, Driving, Hunger

INPUT: /ˈthinking/ ⟶ OUTPUT:/ˈthinking/

Candidates	ROOTING	LHR
☞/ˈthinking/		
/thinkˈing/	*!	*
☞/ˈsinging/		
/singˈing/	*!	*
☞/ˈdriving/		
/drivˈing/	*!	*
☞/ˈhunger/		
/hunˈger/	*!	*

Keys: **ROOTING**: content words must be stressed
LHR: stress should be at the leftmost.

Constraints Ranking: ROOTING>>LHR
Optimal Candidate: ☞

The stress patterns in the Tableaux 2 have revealed cognitive processes characterizing Tiv-E. The results, no doubt, have explained that the respondents are conscious of suffixation (cf Akinjobi, 2006) and prefer to assign prominence to the free morpheme of two-syllabic words ending with *-ing*. It shows that the brain coordination of the respondents was similar. The characteristic feature exhibited by the respondents has provided insight into the cognitive manipulation that describes stress patterns of Tiv-English in two syllabic words that end with either *-ing* or *-er*. From the study, it is significant to mention that the respondents of Tiv-E are 100% close to RP in stress patterns for two syllabic words ending with *-ing* and *-er*, while for other syllabic configurations, there bounds to be similarities and differences, but certainly, the similar ones are more than with difference. Acoustic cues also support perceptual analysis that 100% of the respondents assign prominence to the base form in *thinking, singing, driving* and *hunger*.

Furthermore, the similarity in syllable configuration for *complain* and *comfort* may suggest the stress placement that characterizes them. Specifically, the tokens have two syllables *com* and *plain* for *complain*; and *com* and *fort* in *comfort.* The stress alternation in *complain* and *comfort* explains that the speakers of Tiv-E are conscious of stress assignments. Otherwise, the respondents would have been assigned similar stress patterns. For the analysis of *complain*, 66% of the respondents assigned stress to the second syllable, prototypical to the accent of RP, while 33% had variant stress assignments. It is evident that most of the respondents have similarities with the RP, while 33% did not. It further describes that Tiv-E varies from the RP though not without similarity, which is greater than the differences. The linguistic environment, language exposure and language contact of the respondents, despite their formal education, might have been responsible for the variation. The variation did not indicate that one variety of English is superior to the other. Variation helps to

investigate similarities and differences in types of English. The Tiv-E speakers only showcased the effect of the first language on the second language (Jung, Kim & Murphy, 2017; Kayi, 2006; Kelly & Bock, 1988; Lord, 2007; Sunday & Oyatokun, 2016).

The token *comfort* is more like the RP than *complain.* 73% of respondents assigned prominence to the syllable comparable to the RP, while 26% differed. The findings necessitated a suggestion that stress patterns in Tiv-E are not absolute. The results have explained that an average of more than 55% of the respondents have stress patterns that are like the RP for the tokens.

Tableau 3: Complain, produce

INPUT: comˈplain ⟶ OUTPUT: comˈplain

Candidates	ROOTING	RHR
☞comˈplain		
ˈcomplain	*!	*
☞ proˈduce		
ˈproduce	*!	*

Keys: **ROOTING**: content words must be stressed
RHR: stress should be at the rightmost.

Constraints Ranking: ROOTING>>RHR
Optimal Candidate: ☞

The study further revealed that 23.25% of the respondents were satisfied anti-progressive stress shift in the data analysis for tokens with similar initial syllables (‘con’ and ‘com’). The anti-progressive stress rule assigns primary stress to early syllables in words. It manifested in four out of ten tokens for the study. This reaction was evident in shifting the stress to the syllables that satisfied LHR in Tiv-E, which partially violated RHR (see Tableaux 3). The anti-progressive stress features often occur in bi-syllabic words (Melefa & Amoniyan, 2019). For the 66% of the respondent who shifted their stress patterns to the second syllable produced was identical to the RP.

Similar results were repeated for *produce*. 66% of the respondents appropriately assigned stress to ‘*duce*’, rendering ‘*pro*’ as a prefix which conformed to the RP. But 33% of the respondents were not mindful of the prefix; instead, they exerted energy on the first syllable. The study expressed that the respondents of Tiv English have problems with lexical items with prefixes, though more than 50% of the respondents correctly produced stress patterns that conformed to the RP. The differences have further identified that Tiv English was not approximated to the RP without some level of difference. The differences measured the divergence point between the two English varieties (Tiv-E and RP). From the findings, there was no doubt that Tiv English and RP have absolute similarities in the stress patterns in ‘complain’; however, the similarities were not without differences. Thus, the percentage of similarity was higher than the difference.

6.0 Conclusion/summary

The results from the present study suggest that the stress patterns among Tiv-E speakers are not absolute. The speakers either assign stress that satisfies the left or right. It assumes stress in Tiv-E has variability; however, the speakers’ stress assignment is comparable to the RP despite the variability. The certainty is that average respondents of Tiv-E have stress patterns that are consonance to the RP than

the differences. Education as a significant criterion of Nigerian English and its sub-variety (Udofot, 2003) might have contributed to the closeness in stress placement of two-three syllabic words.

The study further reveals the effect of speech styles on stress patterns. The variety is peculiar in that the stress pattern for setting as nouns or adjectives does not have any similar stress placement in wordlist and passage readings. This suggests that context affects stress patterns in TivE. This approach has not been explored in this variety. However, it is essential to mention that the language background and exposure to multilingualism might have warranted the differences, notwithstanding the complexity of stress patterns in second language situations has its share. Similarly, unlike other studies that argued against duration as a stress cue in NE and its sub-varieties without recommendation (Amoniyan, 2023; Melefa & Amoniyan, 2019; Jolayemi, 2006, 2008; Peng, & Ann, 2001), the present study supported that duration is insufficient to determine stress patterns in TivE. However, it suggests the centre of gravity (CoG) as an additional cue that complements pitch and intensity. Though this study is preliminary, future studies may focus on the tokens with 4-7 syllables in words, compounds, and phrases in isolated or connected speeches. Attention to the minority variety of English in Nigeria helps to juxtapose the major and minor varieties of Nigerian English towards standardization. and to ascertain the recurrent stress placement in Tiv-E to RP. This latter study helps to provide insights into the prosody structures of Tiv-English as a sub-variety of Nigerian English rather than focusing only on the significant varieties of Nigerian English. The study as well creates awareness among the English language teachers in the Tiv community. The present study has shown the hierarchical cognitive structure of stress placement in Tiv-E as NSR>>ROOTING>>LHR>>RHR. For example, word stress is used by native speakers to distinguish words. Inaccurate word stress patterns might also result in misunderstandings between speakers and listeners. When the teachers and the Tiv speakers are aware of this situation, it builds consciousness and awareness among the speakers to retain their variation or be more similar to other varieties as a quest for describing world Englishes continues to thrive.

The study also contributes to OT. Unlike native speakers, whose word stress patterns are near absolutism by word class, the present study revealed that the stress peculiarities in TivE are not without variation. The variation makes having a single output for constraint difficult, except the most frequent patterns are considered for the ranking. If the most frequent patterns are considered, the approach may suggest a uniform variety when it does not because the multilingual situation may not favour a single output. The variation necessitates the flexibility of constraint ranking in TivE. Thus, universal constraints ranking for stress peculiarities by speech styles, syllable complexity, gender and variety is impossible.

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