YORUBA TEENAGE UNDERGRADUATES' EXPOSURE TO TECHNOLOGY-BASED NON-ENCULTURATION SOURCES OF NATIVE ENGLISH AND PRONUNCIATION SKILLS

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Matric No: 167530

A Thesis in the Department of English

Submitted to the Faculty of Arts, in partial fulfillment of the requirement for the Degree

of

DOCTOR OF PHILOSOPHY

of the

UNIVERSITY OF IBADAN

MARCH, 2020

ABSTRACT

Technology-based non-enculturation sources of English are facilities that could assist non-native speakers to access native English. Existing studies have established marked differences between Standard British English (SBE) and Nigerian English, and the inability of supposed models, especially teachers, of the English language in Nigeria to approximate to SBE pronunciation. However, approximation of young Nigerians to native English through technological facilities has not been sufficiently established. University of Ibadan Yoruba teenage undergraduates'use of English stress and rhythm, based on their exposure to technology-based non-enculturation sources of native English, was therefore examined with a view to determining if accentuation from such facilities can serve as alternative model of appropriate pronunciation in Nigeria.

Labov's Variability Concept and Liberman and Prince's Metrical Phonology served as framework. Causal-comparative design was used. Three hundred University of Ibadan teenage undergraduates were selected using purposive sampling for their technological savvy. A native speaker served as the native baseline. A questionnaire was administered to establish the teenagers' level of exposure to electronic media sources, Internet sites and links, social networking sites, audio dictionaries, films and interactive computer games. Respondents were grouped into three categories: High Technology Contact (HTC), Middle Technology Contact (MTC) and Low Technology Contact (LTC). English stress and rhythm competence text designed to elicit semi-spontaneous speeches was read by participants into Speech Filing System (SFS/WASP version 1.54). Datawere analysed using one-way analysis of variance at 0.05 significance level, metrical grid, complemented with acoustic analysis.

The performance of University of Ibadan Yoruba teenage undergraduates was largely commensurable with their level of technology exposure. The HTC approximated better than MTC who, in turn, approximated better than LTC in polysyllabic word stress [$F_{(2;297)}$=53.99]; nuclear stress [$F_{(2;297)}$=63.78]; contrastive stress [$F_{(2;297)}$=50.93]; vowel reduction [$F_{(2;297)}$=101.71]; segmental elision [$F_{(2;97)}$=38.41] and strong/weak (S/W) syllable alternation [$F_{(2;297)}$=45.29]. Metrical grids of HTC predominantly displayed alternation of S/W syllables, while LTC more than MTC produced adjacent stressed syllables which resulted in stress clashes and non-conformity to SBE rhythm. The LTC and MTC mainly retained S/W pattern for both noun phrases and compound nouns, while HTC differentiated them. Appropriate assignment of nuclear stress to the usual and contrastive Designated Terminal Element of simple sentences was commensurate with level of technology contact. Strengthening of vowels in metrically weak positions reduced as technology contact level increased. The HTC predominantly reassigned stress where stress shift was required, while MTC did not reassign stress better than LTC.The HTC had the longest duration and the highest pitch frequency and amplitude on stressed syllables. The stress cues of MTC were sometimes appropriate, while LTC deviated from the norm.

University of Ibadan Yoruba teenage undergraduates' level of technology exposure was commensurate with their ability to approximate native English stress and rhythm. The 21st-century technology-based non-enculturation sources of native English available to teenage Nigerians have the capability of enhancing their spoken English. These technological devices should be explored as alternative model of English pronunciation.

Keywords: Standard British English, Technology-based non-enculturation sources, Nigerian English stress and rhythm, University of Ibadan Yoruba teenage undergraduates

CERTIFICATION

I certify that this work was carried out by Abisola Felicia ADESANYA in the Department of English, University of Ibadan, under my supervision.

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DEDICATION

This study is dedicated to the Lord Almighty whose spirit continually lifts up a standard in my favour; to Him whose assured presence makes me hold my peace for I know that lines are fallen unto me in pleasant places and that I have a goodly heritage.

ACKNOWLEDGEMENTS

To the Lord Almighty who does not need my existence or whatever I stand for to be God but chooses to keep me and, out of His unflinching love and unfailing grace and mercy, fill my heart with this great joy be all the glory, honour and adoration.

It is indeed great privilege and honour for me to have conducted this study under the tutelage of a visionary, sincere and dynamic supervisor, Prof. Adenike A. Akinjobi, without whose invaluable guidance, no level of this research could have been satisfactorily completed. Besides birthing me and many others academically, she has been a mother to me in virtually every sense of it. I remember a few times I have had to cry out my worries right on her shoulders! Even when her right hand chastises, her left is ever ready to draw closer. I hold the mother/daughter relationship (one she created) we have in great esteem and I am immensely grateful for her empathy, patience, encouragement and friendship. She is truly inspirational!

I would like to express my profound gratitude to the Dean, Faculty of Arts, University of Ibadan, Professor Dasylva, the Head of Department, English, Prof. A. M. Kehinde and all lecturers in the department- Prof. Remi Raji, Prof. A. Ogunsiji, Prof. D. Adeyanju, Prof. E. O. Omobowale, Prof. Alo, Prof. A. Odebunmi,Prof. T. Lamidi, Prof. Oha,Dr. A. B. Sunday, Dr. A. Osisanwo among others- for the seeds of scholarship they have sewn in me. My sincere appreciation goes to the PG. coordinator (Department of English), Dr. K. Adebiyi-Adelabu and his assistant, Dr. T.A. Akinseye for their exemplary commitment to the success of this piece. The unparalleled selflessness of the Sub Dean (Postgraduate), Faculty of Arts, Dr. Adeshina Afolayan is specially acknowledged and immensely appreciated.

I humbly appreciate the mentorship and training/grants of the College of Mentors, Council for the Development of Social Science Research in Africa (CODESRIA) in the course of my programme. The knowledge I garnered in the 2017 institute under the coordination of Prof. I. O. Ogachi, Mr. C. N. Diouf, Miss D. T. Sambou-tchicaya and others and the resourcefulness and mentorship of Prof. A. K. Bangura (Howard University), Prof. I. I. Munene (College of Education, Northern Arizona University), Prof. Chris Shisanya (Kenyatta University) and Prof. Joy Obando (Kenyatta University) have remained invaluable to the success of this work. The ideas and contributions of fellow CODESRIA mentee fall on good grounds. My sincere gratefulness is also extended to scholars, in Nigeria and abroad, whose intellectual ideas have contributed to the birth of this new piece.

My deep-seated thankfulness goes to my parents, Mr. and Mrs. J.A. Adesanya, who out of sheer love and care, gave me the greatest legacy that could ever be mine. I pray that they will live to eat the fruit of their labour in sound health in Jesus' name (Amen). Also, the encouragement, support (in all the kinds I have received them) and prayers of all my siblings do not go unappreciated. My deep and sincere gratitude goes to families whom God blessed me with in Ibadan. Worthy of mention are the families of Comrade (Dr.) V.O.M. and M/C Olayinka Ashaolu, High Chief Felix and Chief (Mrs.) Magdalene Usomine Dokpesi, Prof. and (Late) Mrs. Adegboye, Chief and Chief (Mrs.) Oyenuga, Pastor and Mrs. Elobabor, Comrade and Mrs. Fatoki, Dr. Ruth Ochanya Adio-Moses and Dr. (Barr.) Isiaka Okunade. They saw my dream, keyed into it and helped me to actualise it through their constant support, encouragement and mentorship. I pray for more of God's blessings onthem all in Jesus' name (Amen).

I am profoundly grateful to the Pastorate and members of The Redeemed Christian Church of God, Jesus Living Stone, Evang. Rebecca Adeniyi, Prophet John Makinde for their love, encouragement and prayers. The efforts of Mr. Adeniyi O. Aiyeola to ensure the timely completion of this research cannot go unappreciated. I am deeply thankful to my (senior) colleagues in the department and/or fellow supervisees- Dr. Edwin Adeniyi, Dr. Oluwayemisi Aina, Dr. James Akinola, Dr. Amos Agboyinu, Mr. Oludotun Olusoga, Dr. Ibilate Waribo-Naye, Miss Fortune Imosemi, Miss Mary Akaba and others- who assisted in the data gathering process in spite of their busy schedules and/or provided me with the needed support and guidance at different stages of the work. Special thanks to Pharm. Michael Akinjobi and Mr. Mosadoluwa Akinjobi for their technological savvy which brought ease into the drafting of the research questionnaire. Their contributions and assistance have played major roles in turning simple ideas into this concrete piece.

Lastly, I wish to express my overwhelming pleasure and appreciation for the love extended to me by my friends (Mrs. Olubukola Akinola-Akinsola, Mrs. Mojirayo Oshodi, Mr. Olanrewaju Shodimu and others) and my Dovetailers sisters, too numerous to mention. I thank them all for inspiring and adding value to me.

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ABBREVIATIONS

BBC	British Broadcasting Cooperation
CNN	Cable News Network
CSR	Compound Stress Rule
DTE	Designated Terminal Element
ESRCT	English Stress and Rhythm Competence Test
GA	General American
HTC	High Technology Contact
LCPR	Lexical Category Prominence Rule
LTC	Low Technology Contact
LTC	Mid Technology Contact
MP	Metrical Phonology
NB	Native Baseline
NE	Nigerian English
NP	Noun/Nominal Phrase
PCA	Principal Component Analysis
PETEQ	Participant's Eligibility and Technology Exposure Questionnaire
RP	Received Pronunciation
RPPR	Relative Prominence Projection Rule
SBE	Standard British English
SPSS	Statistical Package for the Social Sciences
TC	Technology contact
UIYTU	University of Ibadan Yoruba Teenage undergraduate
UIYTUs	University of Ibadan Yoruba Teenage undergraduates
UIYTUs'	University of Ibadan Yoruba Teenage undergraduates'
WASP	Windows Tool for Speech Analysis

LIST OF SYMBOLS

$(C_{0-3})\ V\ (C_{0-4})$	The structure of the English syllable showing the three initial consonants, the nucleus and the four consonants in the final position
[+ Stress]	Stressed Syllable
[-Stress]	Unstressed Syllable
C	Consonant
EL_2	English as second language
F	Foot
F0	Fundamental frequency
ˌ	Secondary Stress
ˈ	Primary Stress
L_1	First Language
L_2	Second Language
S	Strong Syllable
V	Vowel
W	Weak Syllable
Wd	Word
σ	Syllable

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background to the study

The spread of the English language which began in the seventeenth century due to factors as the British colonialism and leadership in industrial revolution (17th-19th century) and the American economic, political and technological supremacy (beginning from the late 19th century to-early 20th century) has culminated in the globalisation of the language. In the last fifty years, the language has become incontrovertibly acknowledged as a global language and the lingua franca of the world, being the official language of the international and multinational companies and industries, and the language of Internet (Crystal, 2003a, 2003b; McCrum, MacNeil and Cran, 2003; Graddol, 2006).

By the number of speakers, English is the largest language (Mair & Leech, 2006). Kachru's (1985: 196) three concentric circle model based on the history of the spread of English, its mode of acquisition by users and its function in each country where it is adopted categorises countries where English is spoken as the inner, the outer and the expanding circles. The inner circle comprises countries with large communities of native speakers- Britain, United States, Australia, Canada, Ireland, and New Zealand. The speakers in this category totals about 340 million (Crystal, 2003a; Bao, 2006; Rubino, 2006; Patrick, 2006a; Australian Bureau of Statistics, 2013; Statistics Canada, 2014; Statistics New Zealand, 2014).

The outer circle includes users numbering over 1 billion from India, Pakistan, Singapore, Philippines, Ghana, Serra-Leone, Tanzania, Gambia, Jamaica, Nigeria and others. These countries have small communities of native speakers but widespread use of English as a second language for official purposes (Kachru, 1985; Connell, 2006; Schneider, 2007; Trudgill & Hannah, 2008; European Commission, 2012). The expanding circle is made up of Brazil, Germany, Egypt, Poland, Japan, China, Indonesia and other countries where English is learnt as a foreign language. The functions of the English language in such countries are very limited and cannot be said to reflect the actual use of the language (Kachru, 1985; Trudgill & Hannahs, 2008).

The rate at which non-native speakers outnumber native speakers is quite overwhelming. The English language is, therefore, no longer an exclusive reserve of the British. Its use is growing from country to country for local and international communication. Khan (2010:1) describes it as the undisputed lingua franca of the world which has reached many corners of the world with more and more people learning it for many reasons. Currently, its spread is remarkably beyond countries where it has colonial history. It has spatially developed that Awonusi (2004:32) referring to it as 'the most influential language of the world', asserts that 'the rate of its spread is such that would shock some of the early users of the language'. Even after colonial era, many independent countries that were former British colonies continued to use English language, of course setting their own language policies, in predominantly formal contexts. The status and functionality of the English language in such countries are factors contributory to its universality and strength among world languages, serving as 'the primary medium of communication in such domains as government, the law court, broadcasting and the educational system' (Crystal, 2001, 2003a; McCrum, MacNeil & Cran, 2003).

The spread of the English language is accompanied by its consequences. In Kachru's concentric circles, the standard English of the inner-circle countries is often taken as a norm for use of English in the outer-circle and the expanding circle countries. However, its phonological, morphological, syntactic, stylistic and semantic systems continue to contact colourations from various indigenous languages, hence the emergence of world Englishes. With these various adaptations or indigenisations, some scholars are of the opinion that there is a possibility of future divergence of English dialects into mutually unintelligible languages.Yet, many others express optimism about international intelligibility if the standard form continues as the basis of learning and using the language across the globe, thereby unifying speakers from around the world (Quirk, 1985; Carr & Honeybone, 2007; Bermúdez-Otero & McMahon, 2006; Meierkord, 2006).

The next question demanding answer therefore relates to which form should be endorsed as standard norm. Quirk (1985) argues that only the native form should be regarded as standard norm and the basis of teaching and learning the language among all its users. His argument is based on the notion that allowing a continued spread of varieties will ultimately culminate in mutually unintelligible languages or varieties, hence, the eventual loss of its primary essence which is international communication. Quirk's argument generated reactions especially from non-native scholars of English across the globe. For instance, Kachru (1985), regarding Quirk's argument as deficit, contends that the varieties of English spoken in bilingual communities across the world are to be accorded the same English language rights as the native speakers. This view is also supported by Jenkins (2003) and Paradowski (2008). Much as the standpoint of Kachru, Jenkins and

Paradowski holds true, the need to keep all English across the globe mutually intelligible cannot be overstressed.

Although Kachru's classification remains a pivotal basis of delineating the world English varieties, major issues which have direct link with the English language in Nigeria, especially as current linguistic realities are concerned, are unresolved in the model. Much as Kachru's model acknowledges the fact that members and linguistic realities of each circle, particularly the outer and the expanding circles, change over time, hence the mutual inclusiveness of the varieties, the model did not cater for commonalities required among world varieties of the language. Also, the model did not seem to envisage the rapid growth the English language has experienced in recent years. For instance, in Nigeria where English was assigned second language functions, English language is currently the first language of many young Nigerians, particularly children and teenagers of elite families (Akere, 1995; Akinnaso, 1991; Adegbija, 1994; Iduche, 2002; Ogunsanya, 2009). Therefore, considering that the language is thriving above its early roles, especially in the outer and the expanding circles, the model is falling short of catering for the present day communicative realities. Furthermore, pedagogical methods of an acceptable internationally intelligible variety without recourse to native standard norm set by native speakers were not identified by Kachru, despite admitting that that the diffusion of the English language around the world is naturally accompanied by scores of problems relating to codification, standardisation, nativisation, teaching, and description (Okebukola, 2005; Agboyinu, 2018).This probably accounts for the reason the Received Pronunciation (RP) continues to serve as the basis for teaching, learning, describing and assessing the English language in second language contexts of which Nigeria is an integral part.

Variety differentiation studies on Nigerian English have made several submissions on the features that mark it out distinctively from other varieties, particularly the Standard British English. Such studies have established, on the one hand, that such differences between standard British English and Nigerian English are more conspicuous at the phonological level than any other level of language, being basically performance. On the other hand, claims that the suprasegmental features are more challenging for Nigerian users of the English language have also been empirically established. Banjo (1996:71) argues that in many cases, individuals with an impeccable ability to communicate in written English and be understood, even admired internationally, (may not possess) matching ability in spoken English. In corroboration, Olajide and Olaniyi (2003:27) assert that ‘while most non-native speakers of English have been able to cross the hurdle of learning the syntax and semantics of standard British English, a recurrent issue in academic discussion has been the inability to approximate the native-like accentual competence”.

Empirical studies on spoken Nigerian English have established its features at all levels of analysis. At the segmental level, Akinjobi (2013), confirming earlier studies such as Ufomata (1990), Jowitt (1991) and Awonusi (2007), established that Nigerian speakers of English display a tendency towards spelling-based pronunciation of English words, an incidence she attributes more to the discrepancy between spelling and pronunciation in the English language than the well-acclaimed mother tongue influence (Oyinloye, 2010). Predominantly, Nigerian users of English under-differentiate and substitute the English vowels (Awonusi, 2004; Akinjobi, 2009; Olajide and Olaniyi, 2013). It is also a common feature to find Nigerians substitute English consonants that are not available in the sound inventory of their native languages with other sounds that are common to both their native languages and the English language (Jibril, 1982; Jowitt, 1991; Awonusi, 2004; Ugorji, 2010).

At the interphase level, the inability of Nigerians to apply phonological rules is the major feature of Nigerian spoken English. Nigerian users of the English language, probably oblivious of the ease which could accompany English pronunciation when connected speech processes are regarded or the feeling that such pronunciations sound odd, mainly do not apply the phonological rules (Adedimeji, 2007;Oladipupo, 2014; Toki, 2014; Agboyinu 2018). Agboyinu (2018) asserts that Nigerian users of the language do not apply phonological rules, in spite of its potentials for enhancing their pronunciation and promoting both local and international intelligibility.

The suprasegmental features have been shown to be more problematic for Nigerian speakers. Udofot (1997), in line with Tiffen’s (1974) intelligibility study identifies stress and intonation as the most problematic aspects of phonology which tend to characterise spoken Nigerian English rhythm.

Variationist sociolinguistic studies pioneered by William Labov (1966) and further elaborated on in the works of Labov (1972a), Labov (1972b) Trudgill (1974), Trudgill (1983), Milroy (1987), Milroy and Milroy (1991), Hudson (1996), Kerswill and Williams (2000) and Barker (2003) have established relationship between language choices and social variables such as age, gender, socio-economic status among others based on the belief that language is stratified just as society is. The thrust of variability studies, therefore, is the establishment of objective distribution of linguistic features and correlating them with indicators of social stratification, using quantitative methods of analysis. In Nigeria, however, description of linguistic features has been based mainly on social parameters of educational attainment, occupation in addition to geographical regions and conducted mainly on adult members of the society to the neglect of the young ones.

A few variationist studies on spoken English of young Nigerians have, however, been conducted. Oladipupo (2014), adopting gender and social class as variables, asserts that r-liaison does not correlate with gender and social class in educated Yoruba English due to the fact that r-liaison is scarcely used in Nigerian English, especially amongst young speakers who lack exposure to it both in school and in the community. Oladipupo and Akinjobi's (2015) sociophonetic study of young Nigerian English speakers to ascertain any gender and social class variation in speakers' use of the r-liaison and boundary consonant deletion processes observe gender variation only in boundary consonants deletion and no variation in the use of the r-liaison based on gender or social class affiliations. Johnson (2017) established a positive correlation between the socioeconomic background of secondary school students in Oyo and Ogun States and their articulation of English segmentals and suprasegmentals. However, none of these studies has established a relationship between young Nigerians' exposure to technological facilities which grant them access to native English and their English pronunciation.

Studies on Nigerian English stress have attested to a shift of the primary stress to the right in words or delayed primary stress as the most striking attribute of Nigerian English stress. A summary of the observations of Kujore (1985) reveals that Nigerian Englishdisplays a tendency for forward stress. This is manifests in various ways stated below:

- Words with final syllable /n/ and /ɪ/ e.g. *bulletin, javelin, Baptist*
- Women's forenames with final syllable /n/ or final /ɪ/ e.g. *Susan Vivian*
- Verbs and compounds with final obstruents e.g. *to boycott, to elicit, firewood, wardrobe*;
- Self-stressing properties of suffixes like –ate (v), -ise (v), -fy, -ative, -utory, -land, -man, -phone, -day e.g. *indicate, recognise, diversify, indicative, explanatory, candidature, pesticide, competitive, contributive, policeman, telephone, holiday*

- The tendency of suffixes like *-able, -ible, -age, -al, -ary, -ean, -(graph)er, -ism, -mony, -ous* to carry stress forward to syllables preceding them e.g. *indomitable, eligible, parentage, pastoral, planetary, photographer, tribalism, ceremony, prosperous* and
- a tendency of clusters to pull stress forward to the preceding syllable e.g. *ancestor, calendar, orchestra*.

In the same vein, Jowitt (1991:91) observes a tendency to shift the primary stress to the right in Nigerian English, though from slightly different perspective. He observes such occurrences to be more systematic with verbs than with nouns and adjectives. Compound words and complex noun phrases with pre-modification are also noted to have a tendency to shift primary stress as far to the right as possible. He further notes that stress assignment among educated Nigerian speakers of the English language does not reveal any distinction between compound words and phrases. Jowitt highlights examples of hyphenated and open compounds which receive stress on the wrong syllables. His examples include: sitting room, eye hospital, grammar school. He however points out that there are instances where they have the same patterns as in RP. At the sentence level, not only is there a tendency to shift stress as far to the right as possible, resulting in a tendency to assign nuclear stress to an unsuitable word in the sentence, contrastive use of stress is not a common feature of Nigerian English as opposed to Standard English.

Sunday (2010: 54), in his study of the suprasegmentals of bilingual Nigerian adult aphasics, establishes that the stress pattern of the speech of aphasics is not affected by aphasia as they stress words the same way other Nigerians do. Ibasanmi (2013:147) observes, as earlier attested by Sunday (2004), that stress assignment by educated Nigerian speakers of English language does not reveal any distinction between compound nouns and phrases. Sunday and Oyatokun (2016), in line with Yip's (2002: 85), observe that in Nigerian English, high pitch is usually sufficient to determine the position of stress without recourse to the other correlates of intensity and duration. They liken high pitch to the high tone of the indigenous languages of thespeakers.

Studies have also established that the rhythm of Nigerian English is not any different from other English suprasegmentals in its variation from standard British English rhythm. Being mostly tonal and preponderated by strong vowels, Nigerian indigenous languages have been said to have influenced Nigerian English rhythm such that a syllable-timed description is considered more appropriate than the stress-timed rhythm description of Standard British English (Adetugbo, 1977; Bamgbose, 1982; Jowitt, 1991). However, some studies have questioned the description of Nigerian English as syllable-timed. Eka (1993) suggests an 'inelastic-timed' rhythm description. According to him, Nigerian English lacks the rhythm of Standard English due to the failure to 'squeeze-in' or 'stretch-out' the syllables in a rhythm unit as is the case in Standard English which he claims is 'elastic-timed'. Eka's in-elasticity of Nigerian English is caused by the frequency of more prominent syllables than used by native speakers. Udofot's (2000) study likens the rhythm of Nigerian English to 'the pulsation of an African drum, heard as rhythmic but hardly varying its tempo' due to a proliferation of prominent and strong syllables; a tendency to speak both long and short vowels with equal duration unlike the native speaker and a tendency not to push unstressed vowels along with stressed vowels such that the pattern of rhythm is determined by stresses.

Akinjobi (2004: 575-560) having observed a preponderance of strong syllables and vowels in Educated Yoruba English as opposed to Standard British English where there is a preponderance of weak syllablesexamines Eka's and Udofot's descriptions and concludes that their descriptions of Nigerian English rhythm look more like a terminology switch than a totally new description. To her, 'elastic' and 'in-elastic' timing' as used in Eka's study and the features highlighted in Udofot's cyclically returns to the age-long distinction between stressed-timed and syllable-timed languages, given their admittance of a proliferation of strong syllables in Nigerian English in their works.However, one may conveniently say also that studies like Udofot's, highlighting the specific properties of Nigerian English rhythm (which inclines it towards syllable-timed description), do so in order to avoid a categorical distinction of rhythmic typology as the relationship between stress timed languages and syllable timed languages is more scalar than relative. English language is neither absolutely stress-timed nor are languages which have been labelled syllable-timed absolutely so. This accounts for Schluter's (2005) proposition of a scalar rhythmic typology with stress-timed and syllable-timed rhythms at extreme ends of the continuum rather than a categorical distinction. In this sense, it is fairer to describe Nigerian English as *tending more* towards syllable-timed than a categorical syllable-timed description.

Vowel reduction, one of the processes which ensure the isochronous rhythm of the Standard British English is a major point of variation of Nigerian English from its mother variety. The schwa /ə/, which is the most frequent vowel sound in English, is the rarest sound in Nigerian

English (Ufomata 1990). Eka (1993) and Udofot (2000) observe the use of more prominent syllables in Nigerian English than they are used by native speakers. Akinjobi (2004) asserts that there is a preponderance of strong syllables in spoken Educated Yoruba English. She further establishes that this geo-tribal sub-variety is characterised by strengthening of vowels in unstressed syllables of English words whose suffixes require a shift of stress and consequent reduction of vowels; a substitution of strong vowels for the weak sound /ə/ in grammatical words and insertion of a vowel between a syllabic consonant and the preceding sound and, in some cases, substitution of a (strong) vowel for the syllabic consonant (Akinjobi, 2006, 2009a, 2009b). Akindele (2011) and Ilolo (2013) also reveal minimal use of reduced vowels in educated Edo and Isoko English respectively.

Overall, the suprasegmental features of English language pose more problems for Nigerians than its segmental counterpart, on the one hand, and other aspects of language on the other hand. The reasons for this may not be far-fetched. Jowitt (1991) explains that these features of the English language are not acquired as are done by native speakers. They are therefore to be consciously learned and since their complexity seem to repel all but highly motivated learners, they go for the most part unlearned. To Atoye (2005), the difficulty is attributed to undue emphasis placed on structural analysis rather than on communicative value of the features in EL_2 programmes. Another reason identified for Nigerians' inability to achieve or approximate a native-like accentual competence has been the 'which' and 'where' of the English language they learn. Roach (2000) observes that foreign learners of English language learn a style of pronunciation which could be described as careful and formal. To Udofot (2002), the linguistic performance is associated with the second language non-native situation in which Nigerians acquire the language.

Olajide and Olaniyi (2013), based on the factors stated above, therefore charge Nigerian teachers of English language with the responsibility of assisting students to learn by identifying and producing appropriate RP forms for international intelligibility. Studies on the extent to which supposed models of English language in Nigeria, especially teachers of English language, approximate to Standard British English have however established non-approximation and their inability to serve as models of appropriate pronunciation (Akinjobi, 2011; Akinjobi and Aina, 2014; Aina, 2014, 2018; Adesanya, 2014; Agboyinu, 2018). The inability of these supposed models, after whom students and general users of English language may want to pattern their spoken English, to approximate standard forms lays bare a problem of access to appropriate pronunciation.

Roach (2000), however, asserts that rapid casual pronunciation of native speakers can be achieved if certain conditions are put in place. He claims that ‘young children have an enviable ability to acquire the rapid casual pronunciation of a language apparently without effort if they are provided with the necessary social contact with native speakers and meaningful communication situations’. This is, perhaps, a factor responsible for the disparate phonological performances of high school students from two dissimilar socioeconomic backgrounds as established by Johnson (2017). Roach (2000) also claims that adults can ‘pick up’ spoken English if they interact with native speakers. It is probably in light of deliberate attempt at ‘picking up’ that recent scholarly works establishing a phonological approximation of some practitioners to Standard British English have emerged. Ayinde’s (2014) study of the rhythm of some Nigerian corporate radio advertisement reveal a high degree of approximation to RP forms. Adeniyi (2016) also establishes that Nollywood English approximation to Standard British English is significantly high with reference to word and phrasal stress assignment.

Akinjobi (2015) opines that technological innovations, particularly Information and Communication Technology (ICT), have the capability of enhancing the approximation of the spoken form of L_2 speakers of English language, like Nigerians, to Standard English in spite of physical distance between them and native speakers. She highlights some non-enculturation sources of contact with Standard English which may help Nigerians acquire the English language as if in a native speaker setting. These include electronic media sources (radio and television stations) such as British Broadcasting Corporation (BBC), Cable Network News (CNN), Cartoon Network (CN), Mnet Series, Mnet Action, Mnet Premier, BBC Entertainment; Internet sites and links with speech drills; telephony hardware and software for live conversation with native speaker and web-based video conferencing; social network sites such as Facebook, Twitter, Google plus and more; dictionaries with audio aids; computerised speech laboratory as well as British and American films.

Though there have been few previous studies which have examined the spoken English of young Nigerians, these studies have been conducted from the perspectives of socioeconomic background, gender and social class affiliations. There is a dearth of literature which empirically determines the influence of technological facilities through which the present-day teenage

Nigerians have contact with native English and their pronunciation skills. Therefore, this study is premised on Roach's assertion and Akinjobi's recommendations to examine the influence of University of Ibadan Yoruba teenage undergraduates' exposure to technology-based non-enculturation sources and their use of English stress and rhythm.

1.2 Statement of the problem

International intelligibility among varieties of English language across the globeis not achievable without recourse to standard norm set by native speakers. This probably accounts for the Received Pronunciation (RP) continuing to serve as the basis for teaching, learning, describing and assessing the English language in second language contexts, of which Nigeria is an integral part, in spite of claims of its obsoleteness, even in England. Studies have, however, revealed that the RP which is supposed to be the target for Nigerian students and general users of English language is unattainable, even by Nigerian English language teachers as their inability to approximate SBE pronunciationshas been attested to (Akinjobi, 2011; Akinjobi and Aina, 2014; Aina, 2014, 2018; Adesanya, 2014; Agboyinu, 2018). Therefore, there is the need for an ancillary model of standard English pronunciation in Nigeria.

Also, existing studies on spoken Nigerian English which have established its variation from Standard British English (SBE) are found to have been conducted mainly on adults (Banjo, 1979; Jibril, 1982; Jowitt, 1991; Eka, 1993; Udofot, 2001; Awonusi, 2004; Atoye, 2005; Akinjobi, 2004, 2006, 2009a, 2009b among others). Such studies are also observed to have been conducted on the bases of educational background/ attainment or occupation, in addition to geographical origin and ethnicity. Other factors of sociolinguistic variation including age, sex, exposure to technology and social class seem to have received inadequate attention. This leaves a dearth of literature on the spoken English of Nigerian teenagers who have direct exposure to native variety of the English language through technology.

Additionally, technological developments have influenced various facets of human lives. In relation to language use, the 21st century advancement in information and communication technology (ICT) has shrunk the world and collapsed all physical boundaries between native and non-native speakers of the English language (Akinjobi, 2015). Scholarly submissions relating to its impact on English language in Nigeria have only concentrated on its impact on written forms, its availability, extent of utilisation and prospects for (spoken) English language teaching and learning

(Akindele, 2013; Aremu, 2014; Udoh and Egwuchukwu, 2014; Akintunde and Angulu, 2015; Chitulu and Njemanze 2015). This study, therefore, empirically examines the extent to which the technological facilities, through which University of Ibadan Yoruba teenage undergraduates come in contact with native English, influence their approximation to Standard English stress and rhythm.

1.3 Aim and objectives of the study

The aim of this study is examine the influence of technology-based non-enculturation sources of native English on University of Ibadan Yoruba teenage undergraduates' approximation to Standard English stress and rhythm with a view to determining if pronunciation from such facilities can serve as alternative model of appropriate pronunciation in Nigeria. The objectives include:

- To determine if there is any significant difference in the assignment of stress to English polysyllabic words by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).
- Find out whether University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) vary significantly in their use of stress to differentiate compound nouns and phrases or not.
- Find out if there is any significant difference in the assignment of nuclear stress to appropriate syllable of a sentence by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).
- Ascertain whether or not University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) vary significantly in the reassignment of nuclear stress to focused words for contrastive purposes.
- Determine if vowel reduction in appropriate contexts differs significantly in the linguistic performance of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high

technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

- Determine whether or not there is any significant difference in stress shift in the productions of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).
- Find out if appropriate segmental elision varies significantly in the speeches of University of Ibadan Yoruba teenage undergraduates (UIYTUs) based on their level of exposure to and use of technology-based non-enculturation sources of contact with Standard English.
- Establish whether or not there is a significant difference in the alternation of stressed and unstressed syllables in the speeches of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

1.4 Research questions

- Is there any significant difference in the assignment of stress to English polysyllabic words by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC)?
- Do University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) vary significantly in their use of stress to differentiate compound nouns and phrases?
- Is there any significant difference in the assignment of nuclear stress to appropriate syllable of a sentence by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC)?
- Do University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) vary significantly in reassignment of nuclear stress to focused words for contrastive purposes?
- Does vowel reduction in appropriate contexts differ significantly in the linguistic performance of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high

technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC)?

- Is there any significant difference in contextual stress shift in the productions of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC)?
- Does segmental elision vary significantly in the speeches of University of Ibadan Yoruba teenage undergraduates (UIYTUs) based on their level of exposure to and use of technology-based non-enculturation sources of contact with Standard English?
- Is there any significant difference in alternation of stressed and unstressed syllables in the speeches of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC)?

1.5 Research hypotheses

H_1 There is a significant difference in the assignment of stress to English polysyllabic words by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_0 There is no significant difference in the assignment of stress to English polysyllabic words by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_2 University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) vary significantly in their use of stress to differentiate compound nouns and phrases.

H_0 University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) do not vary significantly in their use of stress to differentiate compound nouns and phrases.

H_3 There is a significant difference in the assignment of nuclear stress to appropriate syllable of a sentence by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_0 There is no significant difference in the assignment of nuclear stress to appropriate syllable of a sentence by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_4 University of Ibadan Yoruba teenage undergraduates (UIYTUs)with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) vary significantly in reassignment of nuclear stress to focused words for contrastive purposes.

H_0 University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) do not vary significantly in reassignment of nuclear stress to focused words for contrastive purposes.

H_5 Vowel reduction in appropriate contexts differ significantly in the linguistic performance of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_0 Vowel reduction in appropriate contexts does not differ significantly in the linguistic performance of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_6 There is a significant difference in contextual stress shift in the productions of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_0 There is no significant difference in contextual stress shift in the productions of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_7 Segmental elision varies significantly in the speeches of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_0 Segmental elision does not vary significantly in the speeches of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

H_8 Alternation of stressed and unstressed syllables in the speeches of University of Ibadan Yoruba teenage undergraduates (UIYTUs)with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) significantly differ.

H_0 Alternation of stressed and unstressed syllables in the speeches of University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) does not significantly differ.

1.6 Significance of the study

Several research efforts which have gone into the systematic description of Nigerian English pronunciation have shown that there is a high degree of distinctiveness between RP forms and Nigerian usage at the segmental, the suprasegmental and the interphase levels. These studies have employed educational background, occupation in addition to geographical origin as sociolinguistic variables to the neglect of other variables as age, sex, exposure and social class. Also, the participants of such studies are mainly adults, hence, a dearth of literature on the spoken English of young Nigerians, particularly children and teenagers except a few studies such as Oladipupo (2014),Oladipupo and Akinjobi (2015) and Johnson (2017). Meanwhile, studies have shown that young Nigerians are more technologically savvy than the older subset of the country (Longe and Uzoma, 2007; Tailor and Silver, 2019). Teenage Nigerians who are exposed to technology-based communication channels which can make for social contact with native speakers, therefore, beyond the already established distinctive Nigerian spoken forms, come in contact with the native patterns.

The findings of this research are therefore pertinent to variationist sociolinguistics and the systematic description of Nigerian English pronunciation. Adopting exposure to technology as a key variable charts a new course in the plenitude of Nigerian English description by taking it beyond educational attainments, occupation and geographical origin. It also broadens the scope of the description of spoken English forms in Nigeria by studying the spoken forms of young Nigerians whose speeches have hitherto gained inadequate attention. The connection of technology and spoken English, through the performance of the research participants, reflecting whether or not there are observable significant differences in the participants' use of standard English stress and rhythm, will also be significant for language pedagogy and curriculum planning.

1.7 Scope of the study

This study examines the influenceof University of Ibadan Yoruba teenage undergraduates' exposure to technology-based non-enculturation sources of contact with native English on their approximation to two of the Standard English suprasegmentals with a view to determining if pronunciations from such facilities can serve as alternative model of appropriate pronunciation in Nigeria. The focus will be on the stress and rhythm of the English language phonology and their ancillary features. The choice of these suprasegmental features is pitched on the already established challenges they pose for Nigerian users of the English language. Educated Yoruba teenagers is the target population but the study will be limited to three hundred teenage undergraduates of the University of Ibadan. The participants will be undergraduates who satisfy the criteria for participating in the study. They will, however, be distinguished on the basis of their degree of exposure to and use of technology-based non-enculturation sources of contact with Standard (British) English. They will also be drawn from first and second year students of the University. This is because students in the two levels are predominantly teenagers.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORKS

2.0 Introduction

In this chapter, a review of the relevant literature to the study and the theoretical underpinnings of the study are discussed.

2.1 The syllable

Thesyllable has been described as the first and smallest of the superordinate unit (Mcmahon, 2002:100) of a language at higher level than the phoneme or sound segment and lower than a word (Gimson, 2008:47). It is a matter of fact that the syllable has received a reasonable attention in the description of a language. This universal acceptance of its existence probably owes to the fact that the syllable appears to be the root of all the discussions on the suprasegmentals of the English language. According to Hayes (1995:49), stress anchors not on vowels but on whole syllable. Attesting to the wide recognition that the syllable has received as a unit of language are scholars such as Roach (2000), Hyman (1975).The general notion of its existence has therefore led to many attempts at defining it. However, Blevins (1995:207) observes that while scholars agree that the syllable plays a crucial role in the description of a language, they perceive of it differently.

Generally, the syllable has been described from the perspective of phonology, phonetics or both. Hyman (1975:188) asserts that "most phonologists, to the extent that they have accepted it, deal with the syllable as a phonological unit. Hyman's description is based on what counts as phonologically well-formed in a language such as consonant sequence which should or should not occur in a given position, consonant + vowel combinations etc., thus, giving the constituent structure of a syllable. Also, along the path of phonology is Carr's (2008:171) definition of the syllable. Carr defines the syllable as "a phonological organisation whose central component is a nucleus, which is normally a vowel, and which may be preceded or followed by consonants.

Skandera and Burleigh (2005) approach a description of the syllable from both perspectives. From a phonetic point of view, that is, in terms of how the syllable is produced, the syllable is describe as having a centre, also called peak or nucleus, which is produced with little or no obstruction of air, and is therefore usually formed by a vowel (either a monophthong or a diphthong) which may be preceded by an onset and followed by a coda both of which are produced with greater obstruction of air and, therefore, formed by one or more consonants. On the phonological plane, their description of the syllable rests on the phonotactics (a part of phonology that deals with the rule governing the possible options and combinations of phonemes). They therefore describe the syllable, with respect to the English language which allows for consonant cluster representing consonants with capital C and vowel with V, as having the maximal structure $C_{0\text{-}3}$ V $C_{0\text{-}4}$ (as in *strengths* /streŋkθs/), the minimal structure V (as in *are* /a:/) or any structure in between such as C V C C as in *stop* /stɒp/, C V C C (as in *cats* /kæts/) and C C C V C C (as in *streets* /strɪ:ts/).

Roach (2000:70) perceives of the syllable both phonetically and phonologically. Phonetically, the syllable is defined in terms of how they are produced and the way they sound and phonologically, in terms of the possible combinations of phonemes. To him, from the phonetic point of view, the syllable is described as consisting of a centre which has little or no obstruction to air flow and which sounds comparatively loud. Before and after this centre, there will be greater obstruction to air flow and/or less loud sound. This definition of the syllable suggests that a syllable consists of one or more of three parts: nucleus, (vowel) pre-nucleus consonant(s) technically called the onset and post-nucleus consonant(s)-the coda. Hence the possible options of what might constitute a syllable include:

(a) – onset + centre – coda e.g. *are* /a:/ or / ɔ:/ *err* / ɜ:/

(b) + onset + centre – coda e.g. *bar* /ba:/ *key* /kɪ:/ *more* /mɔ:/

(c) – onset + centre + coda e.g. *am* /æm/ *as* /æs/ *all* / ɔ:l/

(d) + onset + centre + coda e.g. *run* /rʌn/ *sat* /sæt/ *fill* /fɪl/

Roach, however, observes that there are still problems with the phonetic description of the syllable as there is an unanswered question on the yardstick for the division between syllables when they are found in connected sequence which characterises normal speech. He exemplified this difficulty using two words - *going*/gəʊɪŋ / and *extra* /ekstrə/. He argues that the phonetic description of the syllable does not answer question relating to syllable boundaries. In the case of *extra*/ ekstrə/, for example, that the word consists of two syllables is uncontroversial. The point of disagreement relates to the point of syllable division as the optionse/kstrə, ek/strə, eks/trə, ekst/rə and ekstr/ə are possible. However, based on the fact that the phonotactics of the English language does not permit more than three onsets and four codas certain combinations of both e/kstrə and ekstr/əare rejected, leaving three options for the language users to decide.

Phonologically, Roach sums up the English syllable within the restrictions governing phoneme combination, as having the following as its maximal phonological structure:

pre initial	initial	post initial	VOWEL	pre final	final	post final 1	post final 2	post final 3
	ONSET					CODA		

Figure 2.1: Phonotactics of the English syllable (Roach, 2000: 72)

In line with this definition, only the nucleus, represented by the vowel, is obligatory. The onset and coda are optional elements. He however, points out that recent works in phonology make use of a more refined analysis of the syllable which is divided into the onset and the rhyme. The rhyme consists of the vowel known as the peak and the coda. Thus, the structure of the syllable is as follows:

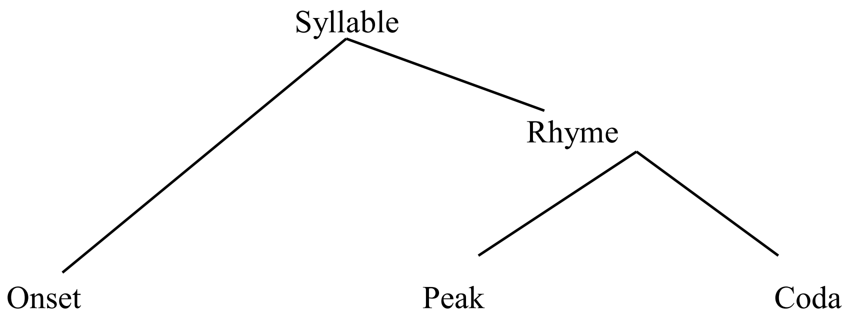
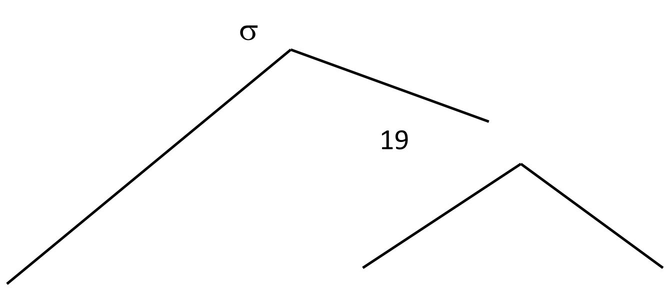


Figure 2.2: The structure of the English syllable(Roach, 2000:77)

It is observed, in the Roachan sense, that one of the two approaches-phonetic or phonological-is not sufficient for a succinct description of the syllable in some instances as both sometimes rely on each other. An example isthe case of *extra* above, where the phonotactics of the English language (the basis of a phonological description) is employed to cater for the inadequacies of the phonetic description. Therefore, an elaborate description of the syllable should have recourse to both phonetic and phonological approaches.

2.1.1 The internal structure and weight of the syllable

A consideration of the possible internal structure of the syllable prompts the question on whether syllable structure is universal or language specific. It is without doubt that while some languages have simple syllabic structure others exhibit complex syllabic organisation. Attesting to this fact, Akinjobi (2004:43) asserts that agreement is by no means universal on the internal structure of the syllable. Kula, Botma and Nasukawa (2011:74) observe that while the prototypical syllable containing a consonant followed by a vowel (CV) are not instructive of internal structuring of syllables at all, more complex systems which allow closed syllables(CVC) and/or long vowels(CVV), require subdivisions on a hierarchical system of constituents in that some elements are more closely related than others. In the process of this division, some scholars employ the ‘flat’ structuring which views the syllable as containing the onset, peak and coda without any sub-constituent as in *farm* containing /f/, /a:/ and /m/. (Kahn, 1976; Clement and Keyser, 1983) while others adopt a binary branching (Kayne, 1984; Kaye et al., 1990; Selkirk, 1982) where the syllable is initially divided into onset and rhyme and rhyme further divided into nucleus and coda as in the figure below:



Rhyme

Onset nucleus Coda

Figure 2.3: Binary branching structure of the syllable (Kaye et al., 1990)

According to Kula, Botma and Nasukawa (2011:75) the vowel which is the nucleus of a syllable is moraic in nature as proposed and analysed by Hayes (1989) and Hyman (1985). (That is, it always contributes to the weight of the syllable). Syllable weight depends on the number of segments in the second half of the syllable. Kula, Botma and Nasukawa (2011:75) present two systems of syllable weight where, in some languages, long vowels and sometimes the closing consonant contribute two moras, thus making the syllable heavy. In some other languages, the weight of the syllable depends exclusively on the vowel they contain, disregarding consonant(s) closing the syllable. This is represented as follows:

	Light		heavy	Examples
a.	– v	– vc	–vv	English, Hungarian, Cairene, Arabic
b.	– v	–vc	–vv	Lardil, Khalka, Mongolian

Two systems of syllable weight (Kula, Botma and Nasukawa, 2011:75)

Based on this system of syllable weight, the rhyme of a light syllable contains only one short vowel (as nucleus) which contributes only one mora. Long vowels and, in some languages, syllables closed by a consonant, contribute two moras (bimoraic), thus make the syllable heavy. Akinjobi (2004:46) following Roach (2000) and Steriade (1992) points out that such linguistic rhyme phenomena as stress and metre are frequently based on the distinction between light and heavy syllables as there is a tendency for heavy syllables to have stress assigned to them rather than light syllables. Hayes (1981), Kula, Botma and Nasukawa(2011) and Gusssenhoven and Haike(2011) label such languages where the distinction between heavy and light syllables can be formalised as a distinction between bimoraic and monoraic, hence requiring bimoraic syllables to be stressed, as ‘quantity-sensitive’.

2.1.2 Syllable and sonority

It is a property of normal speech that, just as some syllables attain more prominence than the others, the individual speech sounds that make up the syllable can be ranked on grounds of relative sonority. (Hooper, 1972, 1976; Vennemann, 1972; Kiparsky, 1979; Selkirk. 1982; Roca, 1994) Skandera and Burleigh (2005:83) attribute this intrinsic ranking to loudness, pitch, duration and sound quality. In simple terms, Roca (1994:153) refers to sonority as the amount of sound let out as the segment (of the syllable) is produced. It therefore follows from this simple definition that the more the obstruction to airflow, the lower the sonority and vice versa. He thus graded various sound classes on the basis of their sonority as follows:

(Oral) stops	least sonority
Fricatives	
Nasals	
Liquids	
Glides	
Vowels	most sonority

Sonority ranking (Roca, 1994)

Obviously, vowels are favoured as syllable needs because of their high sonority rank. Gimson (2008:36) identifies two ways of finding the sonority of a sound within a syllable. First, such sound stands out as more prominent than others.That is, they are felt by listeners to be more prominent than their neighbours. Second is the imagination of the carrying power given to them by their acoustic properties (McMahon, 2002:118). Hence, the determination of sonority is on the basis of length of sound. This makes a vowel like /a:/ clearly have more carrying power than a consonant like /z/ which, in turn, has more carrying power than /b/. The last sound, a plosive, has virtually no sonority at all unless followed by a vowel.

Gimson's scalar representation of the relative sonority of various classes of sound is slightly different from Roca's (1994). His version of the hierarchy is as follows:

Open vowels

Close vowels

Glides /j,w/

Liquids /l, r/

Nasals

Fricatives

Affricates

Plosives

Sonority ranking (Gimson, 2008)

Each level on the hierarchy is at a lower level of sonority than the level above it. However, it is observed that while there is some argument over some of the details of such hierarchy, the main elements are not disputed.

2.1.3 Strong and weak syllables

Just as some segments of a syllable are more sonorous or more prominent than others within the syllable, (the most sonorous being the centre), the syllables of a word do not also occur at the same level of prominence. Akinjobi (2004:49) observes that a noticeable feature of the English language is that many syllables are weak while some are strong. Skandera and Burleigh (2005:71) assert that the same factor to which prominence of a sound can be attributed-loudness, pitch, duration and sound quality-also give syllables their degree of prominence, hence, the distinction between stressed syllable and unstressed syllable.

Roach (2000:89) defines 'strong' and 'weak' to refer to the phonetic characteristics of syllables. A weak syllable has as its peak one of a very small number of possible peaks:

(i) The vowel ə ("schwa")

(ii) A close front unrounded vowel in the general area of ɪ: and ɪ (symbolised i)

(iii) A close back rounded vowel in the general area of u: and ʊ (symbolised u)

Thus, the vowels in weak syllables are found to be shorter, of lower intensity and different sound quality than strong syllable which has as its peak a long vowel, a diphthong (or possibly a triphthong). Also the presence or absence of a coda signifies a strong or a weak syllable respectively (Hayes, 1981; Kula, Botma and Nasukawa, 2011; Gusssenhoven and Haike, 2011). Akinjobi (2004:50) also points out that consonants and vowels in unstressed syllables are subjected to elision or reduction while they get reinforced phonetically in stressed positions.

2.2 Standard English suprasegmentals

In this section, two of the Standard English suprasegmental features- stress and rhythm-will be discussed as well as their ancillary features such as elision, vowel reduction, among others.

2.2.1 Stress

The position of stress at the centre stage of research has grown as scholars have come to consider it very important. Barcelona (2003:333) dates the importance of stress back to the arrival and diffusion of non-linear frameworks in generative phonology. Although the study of stress has been pursued from the beginning of generative theory, the attention devoted to it achieved its climax in non-derivational phonology, not only in metrical phonology but also, in optimality theory.

Stress is a property of syllables (Hayes, 1995:49). From a structural point of view, Hayes (1995) and Gussenhoven (2004) assert that stress is a property of the rightmost or leftmost syllable of a prosodic constituent, the foot. A foot is a sequence of two syllables one of which is strong (S or stressed) and the other weak (W, or unstressed). While feet with S-W sequence are called trochees, those with W-S sequence are referred to as iambs, any of which can be employed by languages. They also point out that stress ultimately has a location in either the leftmost or rightmost edge of the foot and that the way this position reveals itself in any language is dependent on the ways in which that language refers to such locations. The implication of this is the difference in the way languages realise stress depending on how each language chooses to use the structural position represented by the foot.

Roach (2000:93) explains that stress can be studied from the point of view of production and of perception. From the point of view of production, stress is generally believed to depend on the speaker using more muscular energy rather than is used for unstressed syllables. Giegerich (1992:179), also from this viewpoint, describes a stressed syllable as one produced with stronger burst in initiatory energy and with a more powerful contraction of the chest muscle than unstressed syllables. Roach however points out that, though it is difficult to measure muscular effort, it is not impossible because experimental studies have shown that the muscles used to expel air from the lungs are often more active, producing higher sub-glottal pressure when stressed syllables are produced.

From a perceptual point of view, stressed syllables are characterised by prominence. They are recognised as such because they are more prominent than unstressed syllables due to a number of factors as loudness, length of the syllable, pitch and vowel quality (Roach, 2000:94). With prominence as basis for distinguishing a stressed syllable from an unstressed one, Ortega and Prieto (2005:2) define stress as a structural linguistic property of word which specifies which syllable will be stronger. It is also associated with prominence, irrespective of the way such prominence is achieved(Cruttenden, 1986; Marlett, 2001; Collies, 2007; Carr, 2008). Robins (1971:102) as reported by Akinjobi (2004), however, argues against equating stress with prominence as stress, to him, is an articulatory term, hence, should be distinguished from prominence which he sees as 'a more subjective term relating to the more noticeable acoustic impression conveyed by certain parts of the stretch of speech against the rest'. Robins, therefore, defines stress as a genitive term for the relative greater prominence exerted on the articulation of an utterance.

English is a language that makes a clear distinction between stressed and unstressed syllables owing to the inequality of prominence which obtains among syllables as unstressed syllables are noticeably shorter and less prominent than stressed syllables which are also more resistant to reduction processes (Gussenhoven, 2011). For instance, the first syllable in *father* /ˈfa:ðə/ seems stronger than the second. The order is reversed in *again* /əˈgeɪn/ where the second syllable is phonetically more prominent than the first. Hence, the first and second syllables are stressed respectively.

Roach (2000:100) explains that incorrect stress placement is a major cause of intelligibility problems for foreign learners of English language. Odlin (1989) attests to this fact, illustrating with nouns and verbs that are graphically identical such as *combine*/ˈkɒmbaɪn/ (noun) and *combine* /kəmˈbaɪn/ (verb) which only vary according to the acoustic prominence of the syllables. Thus, a misplacement of stress may amount to unintelligibility.

McMahon (2002:129) identifies culmunativity, relativity, hierarchy and rhythm as the most well-established phonetic characteristics of stress. The principle of culminativity suggests that there is one and only one maximally prominent peak within a stress domain (Liberman and Prince, 1977).Kager (1999:145) explains that culminativity, at the word level, amounts to stressability requirement which many languages impose on content words (nouns, verbs, adjectives or adverbs) while relaxing it for function words (articles, pronouns, prepositions etc.) which are prosodically dependent on content words (McCarthy and Prince, 1986). Stress is a culminative property signalled by a number of subsidiary phonetic factors which work together to pick out a stressed syllable from the unstressed ones around it. Such factors include the higher fundamental frequency with which the stressed syllable is produced (that is, the vocal folds vibrate more quickly and this is heard as a higher pitch); the longer duration and the greater intensity with which it is produced, thus making it louder than adjacent unstressed syllables. In addition, stress has effect on vowel quality in that unstressed syllables often reduce to schwa. De Jong (1995) summarily relates the distinction between stressed and unstressed syllables to the articulatory care with which stressed syllables are treated.

Stress is crucially relative (Trager and Smith, 1951; Liberman and Prince, 1977). This means that one cannot distinguish a stressed syllable from an unstressed one if each is spoken in isolation but only by comparing the syllable of each word or a longer string to see which are picked out as more prominent. Based on this property, Kula, Botma and Nasukawa (2011:95) define stress as the relative prominence of one syllable in comparison to another.

Indeed, it is possible to have more than one level of stresswithin the word. Some words have only stressed versus unstressed syllables as in *father*/ˈfa:ðə/ and *again* /əˈgeɪn/. However, in *entertainment* /ˌɛntəˈteɪnmənt/, the first and third syllables bear some degree of stress; both having full vowel /e/ and /eɪ/ as opposed to the unstressed second and fourth syllables with schwa/ə/ but the third syllable is more stressed than the first. The syllable bearing the higher and lower degree of stress are thus assigned primary and secondary stress respectively indicated by special IPA diacritic marks to show the degree of stress as in *entertainment* /ˌɛntəˈteinmənt/. In this gradation lies the hierarchical property of stress.

Stress is also rhythmic in the English language. There is always an alternation of stressed and unstressed syllables. Kager (1999: 145) explains that stress languages show preference for well-formed rhythmic patterns where strong and weak syllables are spaced apart at regular intervals, manifested by the avoidance of adjacent stressed syllables resulting in a ‘clash’ or string of unstressed syllables referred to as ‘lapse’. Akinjobi (2004:53) further adds that stress contrasts are often enhanced segmentally as stressed syllables are products of vowel lengthening or germination while unstressed syllable are weakened by vowel reduction. Gussenhoven (2004:38) also asserts that due to the reduced effort to pronounce vowels in unstressed syllables, their quality is likely to be more centralised and less rounded (more schwa-like) than that of stressed syllable. An alternation between the stressed and the unstressed syllables results in rhythm.

2.2.1.1 Word stress

The subject of English stress has received a large amount of attention. The stress carried by a syllable within the word is referred to as word or lexical stress (Skandera and Burleigh, 2005:85).

Many scholars have attested to the complexity of English stress due to the difficulty involved in predicting which of the syllables in a word takes (primary) stress. Roach (2000:96) asserts regarding the English language that placement of stress within the word is a task that poses a great deal of difficulty, particularly to foreign learners, because the English language is not one of those languages in which word stress can be decided simply in relation to the syllables of the word. McMahon (2002:131) attributes this complexity to the peculiar history of the language. The English inherited from a Germanic system with fixed stress falling on the first syllable of the stem, but it has subsequently been influenced by Latin, French and other Romance languages because of the sheer number of words it has borrowed. It has therefore ended up with a mixture of the Germanic and Romance stress systems.

The languages of the world fall into two broad classes in terms of stress: fixed-stress and free-stress languages (Roach, 2000; Skandera and Burleigh, 2005; McMahon, 2002). In fixed-stress languages, primary stress always falls on one particular syllable as in Scot Gaelic (where main stress is consistently in initial positions except in loanwords); French (where the last syllable is always stressed); Polish (where the penultimate syllable is stressed) or Czech (where the first syllable is usually stressed). Word stress in such languages is fairly predictable as it is governed by rules which apply to almost the entire vocabulary or lexicon (Skandera and Burleigh, 2005). Kula, Botma and Nasukawa (2011:96) states that stress in fixed stress languages could serve to perform demarcating functions (i.e. signal a boundary).

Word stress in free-stress languages is more difficult to predict as they are rule governed only to a limited extent. While some scholars perceive of the English language as a free-stress language others see it as neither falling wholly into fixed stress system nor wholly into free-stress languages (McMahon, 2002:130). However, the varying opinion on which system the English language falls into, scholars universally agree that English word stress is difficult to predict.

Attempts have been made by various scholars to propose some broad general rules for deciding which syllable in a word should receive primary stress. Roach (2000:98) proposes for two-syllable words (which can only be stressed on either the first or second syllable), that the second syllable should be stressed if the word is a verb with the second syllable being strong e.g. *apply* /əˈplaɪ/ *attract* əˈtrækt/, *arrive* /əˈraɪv/, *assist* /əˈsɪst/. If the final syllable is weak, then the first syllable is stressed e.g. *enter* /ˈɛntə/, *open* /ˈəʊpən/, *envy* /ˈɛnvɪ/, equal /ˈɪ:kwəl/. The final syllable is also unstressed if it contains / əʊ/ e.g. *follow* /fɒˈləʊ/, *borrow* /bɒˈrəʊ/. According to Roach, these rules can also be applied to two-syllable adjectives. e.g.

Lovely /ˈlʌvlɪ/	divine /dɪˈvaɪn/
Even /ˈɪ:vən/	correct /kəˈrɛkt
Hollow /ˈhɒləʊ/	alive /əˈlaɪv/

Roach, however, presents adjectives like honest /ˈɒnɪst/, perfect /ˈpɜ:fɪkt/, both of which end with strong syllables but are stressed on the first, as exceptions. He proposes a different rule for nouns which usually have their stress on the first syllable if the second syllable contains a short vowel. Otherwise, it will be on the second syllable e.g. *money* /ˈmʌnɪ/, *product* /ˈprɒdʌkt/, *estate* /ɪˈsteɪt/, *balloon* /bəˈlu:n/.

Three-syllable words are found to be more complicated. The last syllable is stressed if it is strong. Otherwise the penultimate syllable (if strong) receives stress. If the last and the penultimate syllables are weak, the stress falls on the initial syllable e.g.

(i) Entertain /ɛntəˈteɪn/ resurrect /rɛzəˈrɛkt/

(ii) Encounter /ɪŋˈkaʊntə/ determine /dɪˈtɜ:mɪn/

(iii) Parody /ˈpærədɪ/

For nouns, if the final syllable is weak or ends with /əʊ/, then it is unstressed. The middle syllable takes stress if it is strong. However, if the second and third syllables are both weak, then the first syllable is stressed e.g.

(i)	Mimosa /mɪˈməʊsə/	disaster	/dɪˈza:stə/
(ii)	Potato /pəˈteɪtəʊ/	synopsis	/sɪˈnɒpsɪs/
(iii)	Quantity /ˈkwɒntətɪ/	emperor	/ˈɛmpərə/

McMahon (2002:131) also puts forward a set of general rules which allow stress placement to be predicted in many English words as follows:

(a) Noun Rule: Stress the penultimate syllable if heavy. If the penultimate syllable is light, stress the antepenultimate.

aˈroma /əˈrəʊmə/ aˈgenda /əˈʤɛndə/ ˈdiscipline /ˈdɪsɪplɪn/

(b) Verb Rule: Stress the final syllable if heavy. If the final syllable is light, stress the penultimate syllable.

Oˈbey /əʊˈbeɪ/ uˈsurp /juˈzɜ:p/ aˈtone /əˈtəʊn/ ˈtally /ˈtælɪ/ ˈhurry /ˈhʌrɪ/

Beyond the simple words for which the broad rules have been given above are complex words (composed of more than one grammatical unit) which result from affixations and compounding. Affixes are of two sorts in English-prefixes which come before the stem and suffixes which come after. According to Roach, the effect of prefixes on stress does not have the comparative regularity independence and predictability of suffixes and no prefix of one or two syllables always carry stress. Consequently, stress in words with prefixes is governed by the same rules as those for words without prefixes.

Unlike prefixes, suffixes may affect the stress placement within a word and they are grouped into three different categories: suffixes carrying primary stress themselves, those that do not affect stress placement and those that influence stress in the stem (Roach, 2000; Skandera and Burleigh, 2005; Gimson, 2008). In the first category of suffixes, the primary stress is on the first syllable of the suffix. If the stem consists of more than one syllable, there will be a secondary stress on one of the syllables. Examples of such prefixes include *-ee, -eer, -ese, -ette, -esque* as in *refugee*/ˌrefjuˈdʒɪ:/, *mountaineer* /ˌmaʊntɪˈnɪə/ *Jaˌpanese* /dʒæˌpəˈnɪ:z/ *picturesque* /ˌpɪkʧəˈresk/. Gimson (2008) describe these suffixes as accent-attracting.

The second group of suffixes which Gimson (2008) refers to as accent-neutral do not affect stress placement. Such suffixes include: *-able, -age, -al, -en, -ful, -ing, -ish* as in *comfortable*/ˈkʌmftəbl̩/, *anchorage* /ˈæŋkərɪdʒ/,*refusal* /rɪˈfju:zl̩/,*widen* /ˈwaɪdn̩/*wonderful*/ˈwʌndəfl̩/, *amazing*/əˈmeɪzɪŋ/ and *devilish*/ˈdevlɪʃ/. Gimson (2008) identifies the third class of suffixes as stress-fixingsuffixes. These suffixes usually influence the stress in the stem in that, rather than take stress like the first category, they usually shift the stress from the syllable that carried it before the suffix was added to the syllable immediately preceding it (i.e. on the last syllable of the stem). These include: *-eous, -graphy, -ial, -ic, -ion, -ious, -ty, -ive* as exemplified in *advantageous*/ˌædvənˈteɪdʒəs/, *photography* /ˌfəˈtɒgrəfɪ/, *proverbial/*ˌprəˈvɜ:bɪəl/, *climatic*/ˌklaɪˈmætɪk/,*perfection* /ˌpəˈfekʃn/, *tranquility* /ˌtræŋˈkwɪlətɪ/ and *reflexive* /ˌrɪˈfleksɪv/. Roach (2000), however, points out that when suffixes *-ance, -ant* and *-ary* are attached to single syllable stems, the stress is almost always placed on the stem. If the stem is disyllabic, the stress is on one of the syllables of the stem as exemplified in *importance* /ɪmˈpɔ:təns/ *centenary* /senˈtɪ:nərɪ/ and*military* /ˈmɪlɪtrɪ/.

In the case of compound words, the stress may be found on either the first or the second simple word. Characteristically, compound words can be analysed into two simple words which can exist independently as English words. They are written in different ways- sometimes they are written as one word e.g. suitcase, typewriter. They can be separated by a hyphen or space e.g. car-ferry, tea-cup; desk lamp, battery charger (Lamidi, 2012:63).

Roach (2000:108-9) proposes that the first element of the compound is stressed if the two elements are nouns.

Typewriter /ˈtaɪpraɪtə/

Suitcase /ˈsu:tkeɪs/

Tea-cup /ˈtɪ:kʌp/

In compounds (i) where the first element is an adjective and the second an *-ed* form (ii) where the first element is a number (iii) functioning as adverbs and (iv) with an adverbial and functioning as verbs; the final element is usually stressed as in:

Bad-ˈtempered second-ˈclass North ˈEast ill-ˈtreat

Although various rules which English word stress supposedly follows have been proposed as presented above, Skandera and Burleigh observe that these rules seem to have even more numerous exceptions that they do not do justice to the complexity of the phenomenon. Cruttenden (1986) however agrees that general rule with exceptions is still more economical than listing every word with its unique pattern which will therefore imply listing everything as an exception. Nevertheless, Skandera and Burleigh like Roach observed that there are some very broad tendencies relating to word organisation, word class and the presence of suffixes which influence word stress.

2.2.1.2 Sentence stress

Connected speech (that is. an utterance consisting of more than one word) has been attested, in the literature, to behave like polysyllabic words in that just as some sounds within a syllable enjoy more prominence than others and some syllables are more prominent than others within a word, there are more prominent and less prominent words within an utterance (Roach, 2000; Akinjobi, 2004; Skandera and Burleigh, 2005; McMahon, 2002; Gimson, 2008).

The stress carried by a word within an utterance is referred to as sentence stress (Skandera and Burleigh, 2005:85). When English words occur as part of a sentence, the stress assigned to the words becomes gradable (Akinjobi, 2004:60). Hence, the notion of sentence stress is shaped by the stress of some words in relation to others in a fashion similar to what obtains within a word. Gimson (2008:145) however observes that stress in connected speech differs from the usual case of polysyllabic word in that the situation of the stress in connected speech is determined largely by the meaning which the utterance is intended to convey in the particular circumstance in which it is uttered thereby making stress in connected speech freer than those of the word. Consequently, some words which are stressed in isolation may become unstressed while others which have primary stress may have their stress shifted or converted to secondary or tertiary stress.

Although stress patterns in connected speech are freer than those of the words, some words are predisposed to receive and retain their stress as in the isolated form. These are called lexical words. Such word classes are open as the number of words they contain is unlimited and because new words are continually added. They include nouns, adjectives, verbs and adverbs. On the other hand, are grammatical/function words (words with little or no lexical content). They comprise determiners, pronouns, preposition, conjunctions and auxiliary verbs. These classes of words are closed (i.e. the number of words they contain is limited and largely fixed).

Unlike lexical words, grammatical (or function) words usually have more than one pattern of pronunciation-the strong and the weak forms. (Gimson, 2008:147; Roach, 2000:112; Akinjobi, 2004; Skandera and Burleigh, 2005:92). The strong form occurs in both stressed and unstressed position while the weak form only occurs in unstressed positions. A list of the strong and weak forms of Standard English grammatical words are represented in the table below:

Table 2.1: Strong and weak forms of Standard English grammatical words

Words	**Strong Forms**	**Weak Forms**	**Context of Weak Variants** ′
Auxiliary Verbs			
Am	/æm/	/əm/ /m̩/	All weak contexts After /ɪ/
Are	/a:/	/ə/ /ər/	Before consonant Before vowels
Be	/bɪ:/	/bɪ/	All weak contexts
Been	/bɪ:n/	/bɪn/	All weak contexts

Can	/kæn/	/kən/, / kn̩/	All weak contexts
Could	/kʊd/	/kəd/, / kd/	All weak contexts
Do	/du:/	/də/ /dʊ/	Before consonant Before vowels
Does	/dʌz/	/dəz/	All weak contexts
Had	/hæd/	/d/ /əd/	After I, he, she, we,they,you Other weak contexts except at the beginning of a word group where /hæd/ is used.
Has	/hæz/	/əz/ /s/ /z/	After s,z, ʃ, ʒ, ʤ, ʧ After p, t, k, f, θ Other weak contexts except at the beginning of a word where /hæz/ is used
Have	/hæv/	/v/ /əv/	After I, we, they, you Other weak contexts except at the beginning of a word where /hæv/ is used
Shall	/ʃæl/	/ʃəl/, /ʃl/	All weak contexts
Should	/ʃʊd/	/ʃəd/	All weak contexts
Was	/wɒz/	/wəz/	All weak contexts
Were	/wɜ:/	/wə/ /wər/	Before consonant Before vowels
Will	wɪl/	/əl /l/ /l̩/	After vowels and l After I, he, she, we,they,you After consonants except l
Would	/wʊd/	/d/ /wəd/	After I, he, she, we,they,you Other weak contexts
Conjunction			
And	/ænd/	/m̩/	After bilabials

		/ ŋ/ /ənd, ən/	After velars Other weak contexts
As	/æz/	/əz/	All weak contexts
But	/bʌt/	/bət/	All weak contexts
Or	/ɔ:/	/ɒ/	All weak contexts
That	/ðæt/	/ðət/	All weak contexts
Than	/ðæn/	/ ðən, ðn/	All weak contexts
Determiners			
A	/eɪ/	/ə/	Before consonants
An	/æn/	/ən/	Before vowels
Some	/sʌm/	/səm, sm̩/	All weak contexts
The	/ðɪ:/	/ðə/ /ðɪ/	Before consonants Before vowels
Preposition			
At	/æt/	/ət/	All weak contexts
For	/fɔ:/	/fə/ /fər/	Before consonants Before vowels
From	/frɒm/	/frəm/	All weak contexts
Of	/ɒv/	/əv/	All weak contexts
To	/tu:/	/tə/ /tʊ/	Before consonants Before vowels
Pronouns			
He	/hɪ:/	/ɪ/	All weak contexts except at the beginning of a sentence
Her	/hɜ:/	/ə/ /ər/	Before consonants Before vowels
Him	/hɪm/	/ɪm/	All weak contexts
His	/hɪz/	/ɪz/	All weak contexts except at the beginning of a word group where /hɪz/ is used

Me	/mɪ:/	/mɪ/	All weak contexts
She	/ʃɪ:/	/ʃɪ/	All weak contexts except at the beginning of a sentence
Them	/ðem/	/ðəm/	All weak contexts

Adapted from Akinjobi (2004)

Roach (2000:113-120) and Skandera and Burleigh (2005:81) note certain circumstances in which only the strong forms of grammatical words are acceptable. These are stated below:

- In isolation, as in *who?* /hu:/ (as opposed to *I wonder* ***who*** *did it.* /hʊ/)
- At the end of a phrase or sentence as in *what are you looking* ***at****?* /æt/ (as opposed to *I am looking* ***at*** *the wall.* /ət/)
- When the word is being contrasted with another word as in *the letter's* ***from*** *him not* ***to*** *him* /frɒm, tu:/ (as opposed to *He travels* ***to*** *London* /tə/ and *He travels* ***from*** *London* /frəm/)
- In co-ordinated use of preposition as in *I travel* ***to*** *and* ***from*** *London.*
- When a weak form word is used for the purpose of emphasis e.g. *You* ***must*** *give me more money* /mʌst/.
- When being quoted or cited e.g. *I said* ***'of'*** *not 'off'* /ɒv/ as opposed to *a bag of rice* /əv/
- As the first of two consecutive auxiliary verbs without a full verb e.g. *I* ***would*** *have* / wʊd/ as opposed to*I would have liked it.* /wəd/)

2.3 Standard English rhythm

The English language is generally claimed to have a stress-timed rhythm. Its stress-timed rhythm theory allows for a division of speech into more or less equal interval of time called feet (Abercombie, 1979; Martin, 1972; Quirk et al, 1985; Roach, 2000; Jones, 2003, Grabe and Low 2002).

Two rhythm types are identified- stress-timed rhythm and syllable-timed rhythm. While the syllable is the unit of timing in syllable-timed rhythm languages such as French, Telugu and Yoruba, the timing unit of stress-timed rhythm languages such as English, polish, Russian and German is the foot which allows for equidistant intervals between stressed syllables irrespective of the number of intervening unstressed syllables. The categorical distinction between stress-timed and syllable-timed has generated a longstanding debate in recent academic discourse.

Kager (1982:2) claims that stress-timed rhythm occurs as a result of stressed and unstressed syllables occurring at 'rhythmically ideal disyllabic distances' manifested by the avoidance of a sequence of stressed syllables as well as long sequence of unstressed syllables. Ritt (2004:143) however observes that clear-cut evidence in favour of stress-timing is somewhat scarce. Cruttenden (1986) opines that all the syllables in one foot cannot be equal to another foot in exact timing especially if there are many syllables involved. Argument has also been put forward that it is misleading to view English rhythm isochronicity as equal. Rather, the intervals are more equivalent than equal (Knowles, 1974). Auer and Uhmann (1988:241) establish that isochrony is primarily a perceptual phenomenon such that listeners are able to discriminate different durations only when they differ by at least 30 to 50 milliseconds. Research findings of Allen and Hawkins, 1978: 174, Dauer, 1983:59; Graba, Post and Watson 1999: 1204 have also suggested that all children start out with a syllable-timed rhythm or an intermediate stress- and syllable-timed rhythm before English speaking children achieve isochrony through syllable lengthening and shortening.

Schluter (2005:39) therefore proposes a scalar rhythmic typology with stress-timed and syllable-timed rhythms at extreme ends of the continuum rather than a categorical one. This isochrony type is a product of the patterning of certain phonological properties. The most important of these include:

- A sharp contrast in the phonetic properties of stressed and unstressed syllables, the former being heavy and the latter light
- Lexical determination of stress placement in words
- More compensatory lengthening of stressed syllables in stress clashes, and
- More compensatory shortening, vowel reduction and temporal compression of unstressed syllables.

English isochrony is achieved by stress-shift, vowel reduction, phoneme elision and weak forms of grammatical words (Skandera and Burleigh, 2005; Carr, 2008: Schluter, 2005), thereby exhibiting, to a high degree, the phonological characteristics highlighted by Schluter. It is therefore fair to locate English rhythm close to the stress-timing end of the continuum. From the foregoing, we observe that phonological phenomena such as vowel strengthening, vowel weakening, phoneme elision, weak forms of grammatical words are pertinent to a discussion on Standard English rhythm. These concepts are thus important to the present study.

2.3.1 Stress shift

Stress-shift, elision, vowel reduction and weak forms of grammatical words have been identified as means by which English isochrony is achieved (Skandera and Burleigh, 2005; Schluter, 2005; Carr, 2008). Having discussed weak forms of grammatical words in section 2.2.1.2, we will make a review of stress shift in this section. Elision and vowel reduction will be discussed in subsequent sections.

In earlier section of this review, it has been mentioned that English language has an unpredictable stress system. It is therefore rather difficult to predict stress position in English language as it is also the case in languages such as Russian, German and Portuguese. In these languages, stress may be assigned to any syllable in a lexical unit. For instance, in English language, while it is assigned to the final syllable in *technique* and *expertise*, or the penultimate syllable in *tomato* and *position*, it is assigned to antepenultimate syllable in *democracy* and *photography*. The position of stress may, however, shift as a result of morphological processes (such as affixation), grammatical word class and the type of rhythm foot of certain words, especially when such words are used in connected speech (Roach, 2000; Harold, 2002; McMahon, 2002; Gimson, 2008; Davenport and Hannahs, 2010; O'Grady, 2017).

As part of affixes, suffixes may influence the position of stress within a word. Roach (2000) and Skandera and Burleigh (2005) group suffixes into 3 different categories: suffixes carrying primary stress themselves, those that do not affect stress placement and those that influence stress in the stem. In the first category of suffixes, the primary stress is on the first syllable of the suffix. If the stem consists of more than one syllable, there will be a secondary stress on one of the syllables. Examples of such prefixes include -*ee, -eer, -ese, -ette, -esque* as in *refugee* /ˌrefjuˈdʒɪ:/, *mountaineer* /ˌmaʊntɪˈnɪə/ *Jaˌpanese* /dʒæˌpəˈnɪ:z/ *picturesque* /ˌpɪkʧəˈresk/. Gimson (2008) describe these suffixes as accent-attracting.

The second group of suffixes which Gimson (2008) refers to as accent-neutral do not affect stress placement. Such suffixes include: -*able, -age, -al, -en, -ful, -ing, -ish* as in *comfortable*/ˈkʌmftəbl̩/, *anchorage* /ˈæŋkərɪdʒ/,*refusal* /rɪˈfju:zl̩/,*widen*

/ˈwaɪdn̩/*wonderful*/ˈwʌndəfl̩/, *amazing*/əˈmeɪzɪŋ/ and *devilish*/ˈdevlɪʃ/. Gimson (2008) identifies the third class of suffixes as stress-fixingsuffixes. These suffixes usually influence the stress in the stem in that, rather than take stress like the first category, they usually shift the stress from the syllable that carried it before the suffix was added to the syllable immediately preceding it (i.e. on the last syllable of the stem). These include: *-eous, -graphy, -ial, -ic, -ion, -ious, -ty, -ive* as exemplified in *advantageous* /ˌædvənˈteɪdʒəs/, *photography* /ˌfəˈtɒgrəfɪ/, *proverbial/*ˌprəˈvɜ:bɪəl/, *climatic*/ˌklaɪˈmætɪk/,*perfection* /ˌpəˈfekʃn/, *tranquility* /ˌtræŋˈkwɪlətɪ/ and *reflexive* /ˌrɪˈfleksɪv/. Roots have a shift in stress when such suffixes are attached to them.

Mostly in disyllabic words, stress shift occurs as a result of grammatical class of English words. In this sense, context and content of stress change to inform meaning (Harold, 2002, O'Grady, 2017). For instance, some of these words keep the same general meaning but change their word class from noun to verb when the stress moves from the first to the second syllable e.g. ˈconflict/conˈflict, ˈcontest/conˈtest, ˈcontrast/conˈtrast, ˈreject/reˈject, ˈsuspect/susˈpect while others change their meaning completely. Most of the latter change from nouns to verbs while a few change to adjectives. e.g. ˈentrance/enˈtrance, ˈexploit/exˈploit, ˈsubject/subˈject, ˈproject/proˈject, ˈdefault/deˈfault. In the occurrence of this kind of stress shift, there is an accompanying reduction of the nucleus in the unstressed syllable.

There is the tendency in some languages to avoid stress on adjacent syllables (that could result in stress clash) by moving stress from one syllable to another. English language is particularly intolerant of a sequence of stressed syllables occurring adjacently. There is therefore the need to space stress apart in order to achieve the isochronous rhythm of English. This process is called stress shift (Liberman and Prince, 1977; Kager, 1999; Crystal, 2008; Gimson, 2008; Davenport and Hannahs, 2010). Mostly occurring when an iambic foot is followed by a stressed syllable, it is also called iambic reversal. The commonest examples are found in *-teen* numbers. The word *thirˈteen* in isolation, for instance, is stressed on the second syllable. In the phrase *thirteen men*, however, rather than allow the stresses to fall on the two adjacent syllables as in *thirˈteen ˈmen*, stresses are spaced apart as in *ˈthirteen ˈmen* to avoid a clash. Other examples include *bamˈboo→ ˈbamboo ˈtable, carˈtoon→ ˈcartoon ˈnetwork.*

2.3.2 Elision

Phonemes are sometimes realised as null in rapid, casual speech especially when native speakers of English talk to each other so that phonemes expected to be heard are actually not pronounced. Jones (2013:175) and Roach (2000:142-143) argue that though instances of elisions are not far-fetched in rapid colloquial speech, there are no rules governing which sound may be elided and which may not. Roach highlights possible instances of elision as follows:

(i) Loss of weak vowel after voiceless plosives /p, t, k/ e.g.

Tomatoes	potatoes	today	Canary
/tˈma:təu/	/pˈteɪtəʊz/	/tˈdeɪ/	/kˈneərɪ/

(ii) Loss of weak vowels occurring between a plosive or fricative consonant and a nasal or lateral consonant. This results in syllabic consonants for example:

Sudden /ˈsʌdn̩/ awful /ˈɔ:fl̩/

(iii) Elision of consonant occurs in complex consonant cluster simplification e.g.

acts → /ækts/ → /æks/

Twelfth night →/1twɛlfθˈnaɪt/ → /twɛlθˈnaɪt/ /twɛlfˈnaɪt/

(iv) Loss of final /v/ in 'of' before consonants; e.g.

Lots of them	/lɒts ə ðəm/
Waste of money	/weɪst əmʌnɪ/

2.3.3 Vowel reduction

In the context of connected speech, words are often pronounced with varying degree of emphasis, resulting in phonetically full/strong or weak forms. In this sense, two categories of words are identified- lexical/content words and grammatical/function words. In the former, stress is, more often than not, retained on the appropriate syllable as in citation form. Thus, vowels in stressed syllables are produced in their strong/full forms while weak ones are reduced or weakened. The latter, however, often assume two forms- the strong and the weak forms (Roach, 2000; Hewings, 2004; Akinjobi, 2004; Skandera and Burleigh, 2005; Wells, 2006; Gimson, 2008; Dadzie and Awonusi, 2009; Davenport and Hannahs, 2010; Ladefoged and Johnson, 2011; Awonusi, Ademola-Adeoye and Adedeji, 2015).

Stress is culminative, relative, hierarchical and rhythmic and is realised by a number of phonetic features like pitch prominence, duration, vowel quality and intensity (Liberman and Prince, 1977; McCarthy and Prince, 1986; Kager, 1999; Kula, Botmaand Nasukawa, 2011;

McMahon, 2002; Gussenhoven, 2004). Therefore, while vowels in stressed syllables retain their strong/full forms, their weak counterparts undergo a reduction or weakening (a process by which vowels in unstressed positions change to become like the mid central lax vowel (schwa) /ə/) or elision, in which case, a syllabic consonant may become the peak while the vowel gets elided, especially at word boundaries (Roach, 2000; Jones, 2003; Skandera and Burleigh, 2005; Crystal, 2008). The nucleus of a weak syllable is one of a small number of possible peaks: the mid central lax vowel (schwa) /ə/; a close front unrounded vowel which is neither /ɪ/ nor /i:/ symbolised as /i/; a close back rounded vowel which is neither /ʊ/ nor /u:/ symbolised as /u/ and syllabic consonants /l̩/, /r̩/ and any of the nasals /m̩ n̩ ŋ̩ / in weak syllables in which no vowel is found (Roach, 2000).

Apart from the schwa /ə/, a mid-central and lax vowel which automatically signals unstressing (as it never occurs in a stressed syllable), three other kinds of sounds often function as peak of weak syllables. These are /ɪ/, /ʊ/ and syllabic consonants (O'Connor 1975; Gimson, 1975; Roach, 2000). Roach (2000:128) posits that the schwa /ə/ is not a phoneme of English but an allophone of several different vowel phonemes when those phonemes occur in an unstressed syllable. Little wonder, therefore, why it has the highest rate of occurrence in Standard English (Jones 2003: 475). For example, when the stress on the initial syllable of *photo* /ˈfəʊtəʊ/ is shifted as in *photography* /fəˈtɒgrəfɪ/, its syllable peak /əʊ/ gets reduced to /ə/. The close front vowel /ɪ/ and the close back rounded /ʊ/ are two other vowels commonly found in unstressed positions. Roach (2000:85) asserts that the /ɪ/ is neither the /ɪ:/ of *beat* nor the /ɪ/ of *bit*. In the same vein, the /u/ is neither the /u:/ of *shoe* nor the /ʊ/ of *book*. Rather, they share the characteristics of both.

There are syllables in which no vowel is found. In such syllables, either /l/, /r/ or any of the nasal consonant serves, in place of a vowel, as the syllable peak. The consonant functioning as a syllable peak is indicated by a small vertical mark (̩), for example: bottle /ˈbɒtl̩/. Of the syllabic consonants, the /l̩/ is the most commonly used (Roach 2000). It is usually found in cases where there is/are one or more consonant letters followed by 'le' 'al' or 'el' e.g. *rattle* /ˈrætl̩/ *cuddle* /ˈkʌdl̩/ *Jungle* /ˈʤʌŋl̩/ *noble* /nəʊbl̩/. The syllabic /n̩/ is commonly found after bilabial consonants. For example, *happen* /ˈhæpn̩/ and after /f/ or /v/ e.g. *often* /ˈɒfn̩/, *seven* /ˈsevn̩/. /m̩/ and /ŋ̩/ occur as syllabic as a result of phonological processes such as assimilation and elision. The syllabic /r/ is, however, not common in BBC pronunciation as they are in rhotic accent such as most American accent.

2.4 Stratification of Nigerian English

There is already a widespread establishment and recognition of Nigerian English as a variety of the English language, among other world Englishes. The vast literature on this topic attests to its establishment and recognition, asserting not only its existence but also its numerous sociological sub-types (Banjo, 1971; Adeniran, 1979; Bamgbose, 1982; Odumuh, 1984; Kujore, 1985; Adetugbo, 1987; Awonusi, 1990; Jowitt, 1991; Igboanusi, 2001; Akinjobi, 2004 among others). The English language has not only been adopted by Nigerians to fulfill official roles, it has also been appropriated to fulfill roles normally reserved for the mother tongues such that its native speakers have lost exclusive copyright of the language.

Ubahakwe (1979:1) sees the established status of Nigerian English as a dialect subset comparable to the American, Australian, British, Canadian and Rhodesian dialect subset. As observed by Bamgbose (1995) and Adegbija (2004), the English language has been pidginised, nativised, acculturated and twisted to express unaccustomed concepts and mode of interaction. Similarly, Adamo (2007) states that the need to express concepts specific to the nation is the basis of a variety of English called Nigerian. Adekunle (1979:39) notes that Nigerian English is a result of the arrival of the English language in its new ethnolinguistic environment, its contact with local languages and speech habits. It is therefore used in such a way as to project local customs and tradition. In the same vein, Banjo (1975) observes that Nigerian English is borne out of the reaction and adaptation of the English language to a new sociolinguistic environment.

Like any other language (or variety of a language as in this case), Nigerian English is not without its peculiar features which mark it as distinct from other varieties. The 'Nigerianisms' abound at every level of language- phonology, lexis, syntax and meaning- and several studies have attempted to describe these characteristic features through the identification of sub-varieties based on the geographical regions of the country, educational attainment, occupation, context of use, age etc. Early classifications of Nigerian English were mainly based on geographical origin and level of education of the speakers (Brosnaham, 1958; Adeniran, 1979; Adekunle, 1974, 1979; Oladimeji, 2016; Okoro, 2017).

Brosnaham (1958) identifies the varieties of English spoken in Nigeria in levels, from level i-iv. Brosnaham's Level 1 variety is the Pidgin English used by Nigerians with no formal education (such as market women, artisans, labourers etc.) and sometimes used by educated Nigerians in informal environment and when they need to communicate across socio-cultural boundaries. His Level II corresponds to the variety of English used by Nigerians with primary education. Level III in the Brosnaham classification is the English used by people with secondary school educationand is characterised by some degree of communicative fluency and a wide range of lexical items. This variety has the highest number of users. Level IV is the university English used by university graduates, characterised by linguistic features close to Standard English. Hence, based on Brosnaham's categorisation, the best form of English is spoken by University graduates.

Delineating varieties of English in Nigeria based on educational attainment however generated some criticism from scholars (Banjo, 1971; Bamgbose, 1982; Awonusi, 1987). Banjo (1971) claim that no simple correlation can be drawn between formal education and proficiency in English as such will be distorted by many factors some of which Brosnaham (1958:100) himself identifies as 'opportunity for its use, innate ability and intelligence and perseverance with schemes of private study and correspondence schools. Also, because most highly educated Nigerian speakers of English lapse into Pidgin and pseudo-pidgin many times in their use of the language, educational attainment cannot be a reasonable yardstick for standardising English language in Nigeria.

Another educational-attainment-based classification is Adekunle's (1979) which distinguishes three broad varieties of the English language in Nigeria: the near-native speaker variety used by well-educated Nigerians; the local colour variety which results from the contact between the English language and a new ethnolinguistic environment and the incipient bilingual variety which relies more on transliterations and is characterised by deviations from English syntactic structure. Adekunle's classification tilts more to the side of education as a factor as he claims that it is possible to fix any speaker of the English language in Nigeria into any of these varieties without regard to ethnic group of the person.

Banjo's (1971) description of the varieties of Nigerian English rests on the criteria of social acceptability and international intelligibility. He classifies NE into four varieties: Variety i to Variety iv, based on the extent of interference from user's mother tongue and the extent of approximation of Standard English. Banjo's Variety i is marked by wholesale transfer of the mother tongue features. This variety is socially unacceptable because of the great density of mother tongue interference. Variety ii on Banjo's cline is marked by high social acceptability while the Variety iii enjoys both social acceptability and international intelligibility. The Variety iv is characterised by low local acceptability and high international intelligibility. This variety is used by Nigerians who are privileged to have English as their L_1 either because they were born by native-speaker parents or were nurtured in a native speaker setting. According to Banjo (1995:205), varieties i, ii and iii are a 'home-grown'. This makes them more acceptable than Variety iv which is spoken by speakers with direct exposure to L_1 variety of the English language.

Bamgbose (1982), querying Banjo's inclusion of variety IV which is not 'homegrown' in his classification, identifies three varieties of the English language in Nigeria- the Contact English (Nigerian pidgin and Broken English), the Victorian English (closely associated with the cosmopolitan 19th century Lagos Negro English spoken largely by missionaries and other professionals who just returned from Brazil, America, West India and later Sierra-Leone and Liberia) and the School English (SE).

Jibril's (1982) variationist classifications of the varieties of English spoken in Nigeria adopted geographical regions as parameters of classification. His sub-regional varieties were identified such that Nigerians' ethnicity is traceable by the features of their spoken English. Jibril, adopting a geo-tribal dichotomy of the three major languages of Nigeria, identifies Hausa English and Southern English as the varieties of Nigerian English. He further stratifies them into Basic Hausa English and Sophisticated Hausa English, Southern and Sophisticated Southern English. Furthermore, he stratifies the Southern English into two as Yoruba and Igbo English. Akinjobi (2004:63), while admitting that the influence of the local languages on (northern and southern) speakers' performance in English cannot be ignored, perceives of Jibril's merging of Yoruba and Igbo English as Southern English as if they were sub-varieties of Southern English as untenable as both are distinct sub-varieties of Nigerian English.

Awonusi's (1987) socially and geographically motivated pyramidal approach describes Nigerian English as a continuum with the acrolect at its apex, the basilect (low or uneducated Nigerian English) at the bottom and the mesolect which lies between the two extremes. The dynamism of this continuum is a factor that distinguishes it from other classifications as speakers can move up on the pyramid as their level of competence improves and not necessarily as their educational attainments increase. Hence, the mutual exclusiveness which characterises earlier classifications does not apply in Awonusi's.

It is an obvious fact that most descriptions of the English spoken in Nigeria correlate levels of competence with speakers' educational attainment or geographical background and the subjects of such researches have often been adults who not only learned English language as second language but also, in most cases, are not exposed to social interaction with native speakers or communication situation which substitute for such. The present study therefore sets out to describe the spoken English of some educated Yoruba teenagers with concentration on the suprasegmental features. This subset of Nigerian society, who mostly acquire the language as first language, are exposed to social interaction with native speakers and/or communication situations which can make for such. This attempt makes the description of Nigerian English broader as the speeches of young people are incorporated.

2.5 Nigerian English suprasegmentals

Description (derived from previous studies) of the Nigerian forms of the relevant English suprasegmental features are presented below:

2.5.1 Nigerian English stress

Studies over the years have not only proved that the suprasegmental features of Nigerian English are remarkably different from those of Standard British English. They have also shown that the suprasegmental features of SBE pose more difficulties for Nigerian users of the English language than the segmental features (Bamgbose, 1971, 1982; Jibril, 1986; Ufomata, 1996; Jowitt, 2000; Adetugbo, 2004; Akinjobi, 2004). One of such features which Nigerians find herculean is in the area of stress assignment.

The deployment of stress in English ranges from individual words to stretches of utterances (Roach, 2000; Gimson, 2008; Orhero, 2012). Adetugbo (2004:189) acknowledging the paucity of work on the description of Nigerian English stress explains that stress in tone languages, like most Nigeria indigenous languages, seems to be realised by amplitude rather than by length. In contrast to the native speakers of the English language, Nigerians find it difficult to predict which syllable of a word receives primary stress. Hence, such words as *ˈbathroom, ˈchallenge (N), ˈmadam, ˈplantain, ˈHelen, ˈsalad, inˈvestigate, ˈradiator, ˋpetrol, ˈtaxi, ˈkerosene* in British English are realised as *bathˈroom, chaˈllenge (N), maˈdam, planˈtain, Heˈlen, saˈlad, investiˈgate, radiˈator, peˈtrol, taˈxi, keˈrosene* in Nigerian English.

Kujore (1985) observes that Nigerian Englishdisplays a tendency for forward stress. This is manifests in various ways stated below:

- Words with final syllable /n/ and /ɪ/ e.g. *bulletin, javelin, Baptist*
- Women's forenames with final syllable /n/ or final /ɪ/ e.g. *Susan Vivian*

- Verbs and compounds with final obstruents e.g. *to boycott, to elicit, firewood, wardrobe*;
- Self-stressing properties of suffixes like –ate (v), -ise (v), -fy, -ative, -utory, -land, -man, -phone, -day e.g. *indicate, recognise, diversify, indicative, explanatory, candidature, pesticide, competitive, contributive, policeman, telephone, holiday*
- The tendency of suffixes like *-able, -ible, -age, -al, -ary, -ean, -(graph)er, -ism, -mony, -ous* to carry stress forward to syllables preceding them e.g. *indomitable, eligible, parentage, pastoral, planetary, photographer, tribalism, ceremony, prosperous* and
- a tendency of clusters to pull stress forward to the preceding syllable e.g. *ancestor, calendar, orchestra*.

In the same vein, Jowitt (1991:91) observes a tendency to shift the primary stress to the right in Nigerian English, though from slightly different perspective. He observes such occurrences to be more systematic with verbs than with nouns and adjectives. Compound words and complex noun phrases with pre-modification are also noted to have a tendency to shift primary stress as far to the right as possible. He further notes that stress assignment among educated Nigerian speakers of the English language does not reveal any distinction between compound words and phrases. Jowitt highlights examples of hyphenated and open compounds which receive stress on the wrong syllables. His examples include: sitting room, eye hospital, grammar school. He however points out that there are instances where they have the same patterns as in RP. At the sentence level, not only is there a tendency to shift stress as far to the right as possible, resulting in a tendency to assign nuclear stress to an unsuitable word in the sentence, contrastive use of stress is not a common feature of Nigerian English as opposed to Standard English.

Sunday's (2010)assessment of the stress pattern of the speech of bilingual Nigerian adult aphasics shows that their stress pattern is not affected by aphasia, when compared to the stress pattern of Nigerian English as the patients stressed the words *mechanic, challenge (verb), madam,* and *masterminded* the way Nigerian English speakers do. Ibasanmi (2013:147) observes, as earlier attested by Sunday (2004), that stress assignment by educated Nigerian speakers of English language does not reveal any distinction between compound nouns and phrases.

Sunday and Oyatokun (2016), in line with Yip's (2002: 85), observe that in Nigerian English, high pitch is usually sufficient to determine the position of stress without recourse to the other correlates of intensity and duration. They liken high pitch to the high tone of the indigenous languages of thespeakers.

Stretches of utterances in Standard English also display what is termed the isochronicity of stress (O`Connor, 1984; Crystal, 1992; Roach, 2000; Gimson, 2008). This implies a recurrence of stressed syllables at approximately regular interval throughout an utterance, hence, the description of English language as stress-timed. Nigerian English however tends towards syllable-timing as each syllable in an utterance receives equal or equivalent prominence. Nigerian English is also devoid of the emphatic function of stress as in British English. Such that in Nigerian pronunciation. There is hardly any difference between the two utterances:

(i) The girl was SAD (not happy) and

(ii) The girl WAS sad (not present)

Studies on the extent to which supposed models of English language in Nigeria, especially teachers of English language, after whom students and general users of English language may want to pattern their spoken English, approximate to Standard British English lexical and phrasal stress have also established non-approximation and their inability to serve as models of appropriate stress assignment (Akinjobi and Aina, 2014; Aina, 2014; Adesanya, 2014). However, those conducted on Nollywood actors revealed a high level of approximation to SBE. Akindele (2012) attributes the inadequacy of the Nigerian users of English, regarding stress assignment on the mode of acquisition of the language. Nigerians as L2 speakers learn the rules governing the assignment of stress on English words and sentences in the classroom setting while it is naturally acquired by the L1 speakers. Their proficiency is therefore dependent on their mastery of such rules. Their inappropriate stress assignment is not without its consequences. Being an integral non-lexical carrier of meaning, inappropriate placement of stress inhibits international intelligibility especially to the native speakers.

2.5.2 Nigerian English rhythm

In spite of the argument against a categorical description ofStandard English language rhythm as stress-timed and Nigerian English as syllable-timed, there is a general acceptance that there is a marked difference between the rhythmic forms. These studies have also established that one of the aspects of English phonology where Nigerians experience difficulty is rhythm (Banjo, 1971; Adetugbo, 1977; Bamgbose, 1982; 1995; Jibril, 1982; Eka, 1985; Udofot, 1997). Banjo's (1971) four-way international intelligibility and social acceptance classification of Nigerian English shows (as part of the characteristics of Nigerian English phonology) a substitution of syllabic prosody for the isochronicity of stress in Standard English cutting across Varieties I, II and III with instances thinning out as one goes from variety I upward. The reason for this (as asserted by Adetugbo, 1977; Bamgbose, 1982; Jowitt, 1991) is the influence of syllable-timing of Nigerian indigenous languages on spoken Nigerian English.

However, other studies against the description of Nigerian English as syllable-timed have emerged,beginning from the early 80s. Eka (1985:1-11) rejects the syllable-timing description of Nigerian English. He describes the rhythm of educated Nigerians as 'inelastic-timed' because the speakers seem to have more prominent syllables than the native speaker due to their inability to 'squeeze in' or 'stretch out' the syllables in a given rhythm unit within the given time, in contrast with the native speakers' use of elastic-timed rhythm.

Udofot's (2000) claims that syllable-timing and stress-timing are terms referring to trends or underlying patterns which do not apply in the real world for neither the native speaker's speech is 100% stress-timed nor the Nigerian speaker's fully syllable timed. She, therefore, likens the rhythm of Nigerian English to 'the pulsation of an African drum, heard as rhythmic but hardly varying its tempo'. Her description is due to a proliferation of prominent and strong syllables; a tendency to speak both long and short vowels with equal duration unlike the native speaker and a tendency not to push unstressed vowels along with stressed vowels such that the pattern of rhythm is determined by stresses.Based on these observations, she then avers that neither the stress-timing theory nor the syllable timing will fairly describe Nigerian English rhythm though the latter is noticed in the speech of Non-standard variety but thins out as one moves up the Nigerian social strata to the peak, the sophisticated variety. She therefore proposes Bolinger's (1981)full-vowel timing descriptions for Nigerian English rhythm.

Gut and Milde's (2000) study revealed significant differences in the speech rhythm and syllabic structures of Nigerian English and its British counterpart. Akinjobi (2004:98) criticises Gut and Milde's claim on the basis of the heterogeneous nature of the experimental subject and the population of the subjects used. Though the subjects were homogeneous in the fact that they were all Nigerians speakers of English language; born and educated in Nigeria and they all have university degrees, their 'geo-tribal' peculiarities were not adequately considered. The five Nigerian subjects were not only considered insignificant for Gut and Milde's generalisation, they also did not share any linguistic background.

Akinjobi's (2004) geo-tribal approach to the study of Nigerian English establishes a preponderance of strong syllables and vowels in Educated Yoruba English as opposed to Standard British English where there is a preponderance of weak syllables. She, therefore, concludes thatEka's and Udofot's descriptions of Nigerian English rhythm look more like a terminology switch than a totally new description. To her, 'elastic' and 'in-elastic' timing' as used in Eka's study and the features highlighted in Udofot's cyclically returns to the age-long distinction between stressed-timed and syllable-timed languages, by admitting a proliferation of strong syllables in Nigerian English in their works.

2.6 Sociolinguistic studies of spoken English of young Nigerians

Based on the belief that language is stratified just as society is, variability studies establish objective distribution of linguistic features and correlate them with social variables such as age, gender, social class, socio-economic status among others (Labov 1966, 1972a, 1972b; Trudgill 1974,

1983; Milroy 1987; Milroy and Milroy 1991; Hudson 1996; Kerswill and Williams 2000; Barker 2003). Scholarly sociolinguistic discourse of spoken Nigerian English which have been largely concentrated on adult members of the society, usually on the bases of educational attainments and occupation, has recently begun to give some attention to the spoken forms of young Nigerians, adopting other sociolinguistic variables such as gender, social class and socioeconomic background (Oladipupo,2014; Oladipupo and Akinjobi, 2015; Johnson, 2017).

Oladipupo (2014) reveals that Nigerians' usage of Standard British English connected speech processes does not reveal gender or age variation. In the same vein, Oladipupo and Akinjobi (2015) attempted a sociophonetic study of young Nigerian English speakers to ascertain any gender and social class variation in speakers' use of the r-liaison and boundary consonant deletion processes. Their study revealed that while male speakers delete more boundary consonants than their female counterparts, the educational advantage and social exposure of the high class over the low class does not, in any way, translate to superior performance in the use of r-liaison. Johnson (2017) reveals that while students of high socioeconomic background approximated to RP in their articulation of English segments and suprasegmentals, those of low socioeconomic background deviated from Standard English form, thus establishing a positive correlation between the socioeconomic background of secondary school students and their English pronunciation skill. However, none of these studies has established a relationship between young Nigerians' exposure to technological facilities which grant them access to native English and their pronunciation.

2.7 Technology-based non-enculturation sources of native English

The term *non-enculturation sources of standard spoken English* was first used by Akinjobi (2015) to refer to technological facilities that could assist non-native speakers to access native English.The universality and strength of the English language among world languages is already an established fact as a result of its use and sense of indispensability (Crystal, 2003, 2007; Gutpa, 1997; Awonusi, 2004; Mydan, 2007; Khan, 2010; Akinjobi, 2012). Awonusi (2004:32) describes it as 'the lingua franca of the world' whose spread is such that would shock some of its early users. The English language has not only spread beyond countries where it had colonial history, it has also been indigenised in many countries of the world. This gave birth to the recent clamour for the world Englishes (Kachru, 1995). Thus, many Englishes which would have been considered substandard and error-ridden are afforded the opportunity of being recognised as varieties (Akinjobi, 2015). One of such varieties is the Nigerian English.

Much has gone into the description of the Nigerian variety of English language. Studies have confirmed that Nigerian English shows variation from its mother variety, the Standard British English, at all linguistic levels. One of such levels is phonology (Tiffens,1974; Adeniran, 1974; Adetugbo, 1977; Jibril 1982, 1986; Banjo 1971, 1979, 1995, 1996; Adegbija 1989; Bamgbose 1982, 1995). Such researches, mostly carried out on the bases of geographical origin and educational attainment, have also confirmed that the variation between Standard British English and Nigerian English is most conspicuous in the spoken form. At the segmental level, its characteristics include: under-differentiation and substitution, consonant substitution and approximation, spelling-cued mispronunciation, non-application of phonological rules, and more (Jowitt, 1991; Akinjobi, 2013; Atoye, 2005; Toki, 2014; Agboyinu, 2018). The suprasegmental features have been confirmed to pose a greater challenge characterised by a number of features as rightward shift of or delayed word stress, non-assignment of nuclear stress, minimal use of stress to contrast meaning, inappropriate assignment of intonation tunes, retention of phrasal stress for compound nouns, preponderance of strong syllables in NE as opposed to SBE etc. (Kujore,1985; Jowitt, 1991; Udofot, 1993 1997, 2000; Akinjobi, 2002, 2004, 2005,2006, 2011; Atoye, 2005; Akindele, 2011; Ilolo, 2011; Aina 2014; Adesanya, 2014).

The 'which' and 'where' of the English language Nigerians learn have been identified as a major reason for the marked differences between the British English and Nigerian English. Roach (2000:211) observes that foreign learners of English language learn a style of pronunciation which could be described as careful and formal. To Udofot (2002), the linguistic incompetence is associated with 'the second language non-native situation in which Nigerians acquire the language'. Roach however asserts that it is not impossible to approximate a native speaker's rapid casual style of pronunciation rather than the careful and formal style of communication associated with foreign learners. He claims that 'young children have an enviable ability to acquire the rapid casual pronunciation of a language apparently without effort if they are provided with the necessary social contact with native speakers and meaningful communication situations'. There are also claims, according to him, that adults can 'pick up' spoken English with such communication provisions.

According to Akinjobi (2015:9) such approximation to Standard English would have been an illusion for a non-native speaker who is miles away from the native setting of English but for the 21st century advancement in information and communication technology. Electronic interaction, through information technology has 'shrunk' the world and collapsed all the physical boundaries separating native from non-native speakers. Native English is, therefore, brought closer to non-native speakers through non-enculturation sources as electronic media sources (radio and television stations) such as British Broadcasting Corporation (BBC), Cable Network News (CNN), Cartoon Network (CN), Mnet Series, Mnet Action, Mnet Premier, BBC Entertainment; internet sites and links with speech drills, telephony hardware and software for live conversation with native speaker and web-based video conferencing; social network sites such as Facebook, Twitter, Google plus and more; dictionaries with audio aids; computerised speech laboratory as well as British and American films. These sources will not only improve spoken English learning and use in non-native contexts such as Nigeria (Iyere, 2007; Akindele, 2012), they will also make Nigerian English, as well as other Englishes remain in contact with standard forms and enhance world intelligibility.

2.8 Regional variation between Standard British English and General American English

One of the factors which contribute to the global spread of the English language is the American technological supremacy(McCrum, MacNeil and Cran, 2003; Graddol, 2006). Taking into account that many of the technological facilities that are being considered, in this study, as ancillary model of approximation to native English are American innovations, it is pertinent to examine the two major standard umbrella varieties of the British and the American accents of English. Doing this will help us to avoid lexical items with two different appropriate stress patterns in the course of data gathering.

The Standard British English (SBE), also known as Oxford English, the Queen's English, and BBC English, refers to the standard dialect of English language spoken and written in the United Kingdom, especially in Great Britain (Oxford English Dictionary). General American English, like the SBE, refers to the standard variety of American English, largely perceived as lacking any ethnic or socioeconomic colourations, mainly spoken by highly educated Americans, Americans from the North Midland, Western New England and western regions of America (Wells, 1982; Kövecses, 2000; Clopper, Levi and Pisoni, 2006).

The Received Pronunciation (RP) (exclusively concerned with the spoken form of the SBE and most widely used model of teaching English language to foreign learners) has been the subject of many academic debates relating to its decline in favour of other less-conservative dialects, the negative perception about the RP being associated with undeserved privilege and its acceptability as a model of teaching and learning the English language, especially to foreign learners. (Fowler, 1996; Moreno Falcón, 2016). There have also been widespread claims that only a negligible percentage (ranging between 2% and 10%) of Britons speak the RP (Trudgill, 1974; Wells, 1982; Crystal, 2007). Yet others hold the view that such estimates are mere guesses that are not based on any robust research (Upton, 2019). Whatever the views about the RP, it is the most widely studied model of English pronunciation and the adopted model of teaching English language to foreign learners, Nigerians inclusive.

There are considerable variations between the two major standard umbrella variety of the British and the American accents of English- the Standard British English (SBE) and the General American English (GA). While such variations exist in the phonology, vocabulary, spelling, and grammar of both varieties, the differences are strongest on the level of phonology (Kortmann

(2005). With regards to spellings, words with *-our* endings such as *colour, favour* in SBE are spelt as *color, favor* in GA. The letters *c* and s in words like *licen**c**e, defen**c**e, analy**s**e, organi**s**e* in SBE are substituted with *s* and *z* respectively in GA such that the words are realised as *licen**s**e, defen**s**e, analy**z**e, organi**z**e* in GA. The *-re* endings of words like *theat**re**, cent**re***in SBE are reordered in GA as *theat**er**, cent**er***. Some double letters in SBE are spelt single in GA and vice versa e.g.*dialled, cancelled* in SBE spelt as *dia**l**ed, cance**l**ed* in GA; *insta**ll**ment, ski**ll**ful* in GA spelt as *insta**l**ment, skilfu*l in SBE. The SBE *tyre, programme, and catalogue* are realised in GA as *tire, program and catalog* respectively (Finegan, 2004; Kortmann, 2005).

Some words in the vocabulary of English have variant forms in both varieties. Examples of such include (SBE→GA) lift→elevator, petrol→gas/gasoline, lorry→truck, queue→line, torch→flashlight, boot (of a car)→trunk, rubbish→garbage, holiday→vacation, car park→parking lot etc. Noticeable variations also exist at the grammatical levels of both varieties. For instance, the verb *get* has only one past participle form in SBE, *got* unlike in GA where it has two- *got* and *gotten.* For experiential perfect form in SBE such as *Have you ever gone to Rome?,* the simple past (*Did you ever go to Rome?*) is used in GA (Crystal, 2004).

The greatest variation between SBE and GA is exhibited in the spoken form. The differences are, however, mainly relate to the segments (Wells, 1982; Roca and Johnson, 1999; Kortmann and Schneider, 2004). In contrast to SBE (henceforth RP, being exclusively dealing with pronunciation), General American exhibits features relating to consonants as t- and d-flapping, rhoticity, t-glottalisation, l-velarisation and vowel such as yod-dropping, pre-voiceless /aɪ/ raising, weak vowel merger in GA. These features are discussed below:

- Rhoticity: Full realisation of /r/ at word initial, medial and final position is a feature of GA that distinguishes it from RP. The phoneme /r/, only pronounced in RP when it is immediately followed by a vowel sound, is pronounced before a consonant and at the end of an utterance in GA (Collins and Mees, 2003). RP either has no consonant (if the preceding vowel is /ɔː/, /ɜː/ or /ɑː/, as in *bore*, *burr* and *bar*) or has a schwa instead. (in the cases of diphthongs or triphthongs). Similarly, where GA has r-colored vowels (/ər/ or /ɜr/, as in *cupboard* or *bird*), RP has plain vowels /ə/ or /ɜː/. The intrusive r of many RP speakers in an utterance as *the idea-r-of it* is absent in GA.

- The trap–bath split, a change from flat /æ/ to broad /ɑː/ has, according to Collins and Mees (2003), resulted in RP having the back unrounded open vowel /ɑː/ in many words where GA has a front open unrounded vowel /æ/. Typically, this RP vowel occurs when followed by/nt/, /ntʃ/, /ns/, /s/, /f/, or /θ/ (e.g. *aunt, pass, laugh, path*).
- Many loanwords and foreign names and with *a* are pronounced as /æ/ in RP and /ɑː/ in GA. For instance, the surname of Thomas Mann which is pronounced with the tense /ɑ/ in GA rather than lax /æ/ as in RP (Lindsey, 1990). Other words include *pasta*, *macho*, *kebab*, and *taco*.
- Comparing the monophthong inventory of the RP and the GA, RP has three open-back vowels, where GA has only two or even one. GA speakers use /ɑ/ for both the RP /ɒ/ (*spot*) and /ɑː/ (*spa*). Many American speakers use the same vowel for the RP /ɔː/ (the cot–caught merger). Vowel length, a phonemic property of the RP is rather phonetic in GA (Well, 1982; Roach, 2004). Hence phonemically long vowels in RP are transcribed without the length mark in GA. The vowels of GA (with the exception of the schwa /ə/ which is typically short in all contexts [ə̆]) are phonetically short [ɪ, i, ʊ, u, eɪ, oʊ, ɛ, ʌ, ɔ, æ, ɑ] when they precede voiceless consonants /p, t, k, tʃ, f, θ, s, ʃ/ in a syllable and long [ɪˑ, iˑ, ʊˑ, uˑ, eˑɪ, oˑʊ, ɛˑ, ʌˑ, ɔˑ, æˑ, ɑˑ] in other contexts. The minimal pairs *kit* and *kid* therefore have a vowel phonetically distinguished lengthwise. According to Wells (1982), all unstressed vowels are shorter than stressed ones. Also the more unstressed syllables follow a stressed one, the shorter the stressed syllable is, such that /i/ in *lead* is noticeably longer than in *leadership*in GA. Figure 2.2 and Figure 2.3 show the pure vowel charts of RP and GA.

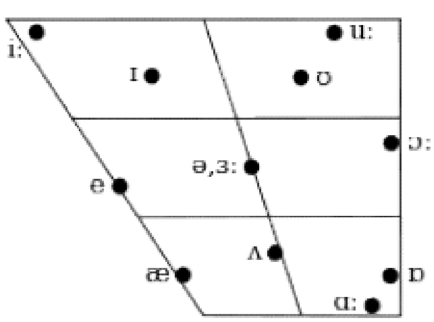


Figure 2.4: Monophthongs of RP (Roach, 2004)

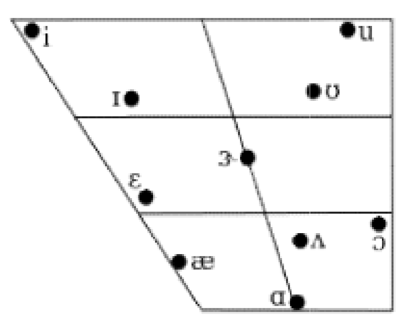


Figure 2.5: Monophthongs of GA (Wells, 1982)

- The distinction between unstressed /ɪ/ and /ə/ (for example, *roses* vs *Rosa's*) is sometimes lost in GA, while in RP it is retained. Therefore, *batted*/ˈbætɪd/ and *battered*/ˈbætəd/ in RP are not homophones.
- Where GA has /i/ in an unstressed syllable at the end of a morpheme (in inflected forms), conservative RP has /ɪ/. For instance, *candied* and *candid* are homophones in RP, but not in GA.
- Flapping is common feature of GA such that *metal* and *medal* which have different pronunciation in RP are both produced as [ˈmɛɾl̩]. This situation occurs where either a /t/ or a /d/ occurs between a sonorant and an unstressed vowel. Its realisation is an alveolar-flap allophone [ɾ]. The degree of flapping, however, varies considerably among speakers, depending on the formality of the setting. Flapping is largely reduced in formal setting and it occurs, to an extent, in nearly all speakers of American English,
- *Yod*-dropping occurs in GA at the onset of stressed syllables after all alveolar consonants- /t/, /d/, /θ/, /s/, /z/, /n/, /l/ (Wells, 1982: 206-207). The /juː/, spelt as *u*, *ue*, *eu*, *ew*, in words like *due, new, allude,* is pronounced /u/ as in /du/, /nu/, /əˈlud/ in contrast to RP speakers who produce /djuː/ or /dʒuː/, /njuː/, /əˈljuːd/.
- Although, y*od*-coalescence occur in both GA and RP in unstressed syllables or after a stressed vowel. RP retains the yod more often, especially in careful speech, than GA. For instance, *issue* in RP /ˈɪsjuː/ or (as GA) /ˈɪʃu/, *graduate* may be carefully enunciated in RP as /ˈgradjʊeɪt/, but *nature* is always coalesced /ˈneɪtʃə(r)/ (Wells, 1997). In both GA and RP, however, the sounds of word-final /d/, /s/, /t/, and /z/ (spelled either *s* or *z*) can coalesce with the sound of word-initial /j/ (spelled *u* or *y*) in casual or rapid speech, becoming /dʒ/, /ʃ/, /tʃ/, and /ʒ/ respectively, thus *this year*/ˈðɪʃɪə(r)/ can sound like *thi(s) shear/sheer*. This is also found in other English accents.
- The voiceless stops /t/, /p/, and /k/ have a stronger aspiration in RP.
- Most General American accents have undergone vowels mergers before /r/: the *nearer-mirror* and *hurry-furry* mergers, and some variation of the *Mary–marry–merry* merger, a total three-way merger being the most common throughout North America which RP does not have.

A few variations exist in the word stress assignment between RP and GA. Examples of such words include *address* (verb), *donate, research* which are stressed on the first syllable in GA and on the second in RP. French loanwords like *garage, café, ballet, brochure* are stressed on the initial syllables in RP and on the final syllables in GA, thereby preserving the original French stress pattern (Smitterberg, 2017).

2.9 Acoustic phonetics

The invention of the Edison phonograph which allowed the recording, processing and analysis of speech signal in the 19th century is said to have advanced the study of acoustic phonetics. Acoustic phonetics is a subfield of phonetics which deals with physical properties of speech sounds. It investigates the mean squared amplitude of a waveform, its duration, its fundamental frequency, or frequency domain features such as the frequency spectrum, or even combined spectrotemporal features and the relationship of these properties to other branches of phonetics- articulatory or auditory- and to abstract linguistic concepts such as phonemes, phrases, or utterances (Clark and Yallop, 1995; Johnson, 2003; Ladefoged, 1996; Stevens, 2002).

Sound waves can be periodic or aperiodic (Ladefoged, 1996; Ogden, 2009; Ladefoged and Johnson 2011). Being periodic, means their cycles are regular and repetitive. The types of speech sounds that would appear as a periodic sound wave are voiced sounds, such as vowels or nasals. Since such sounds have regularly repeating waveforms. This makes them decodable through Fourier analysis which breaks down the component sine (simple) waves. This type of graph is called a spectrum, which does not measure time. Instead, the x-axis measures frequency, and the y-axis represents the sound pressure level. On this type of graph, the f0 is calculated by selecting the lowest frequency component of this complex wave, usually the first complete peak on the spectrum. From this fundamental frequency peak called harmonics (the natural resonances within the vocal tract) occur at evenly spaced integer multiples. Aperiodic sounds, on the other hand, do not have a regular repeating pattern. Speech sounds in this category are transients (such as plosives) and continuous sounds (voiceless such as voiceless fricatives). Hence, fundamental frequency cannot be calculated.

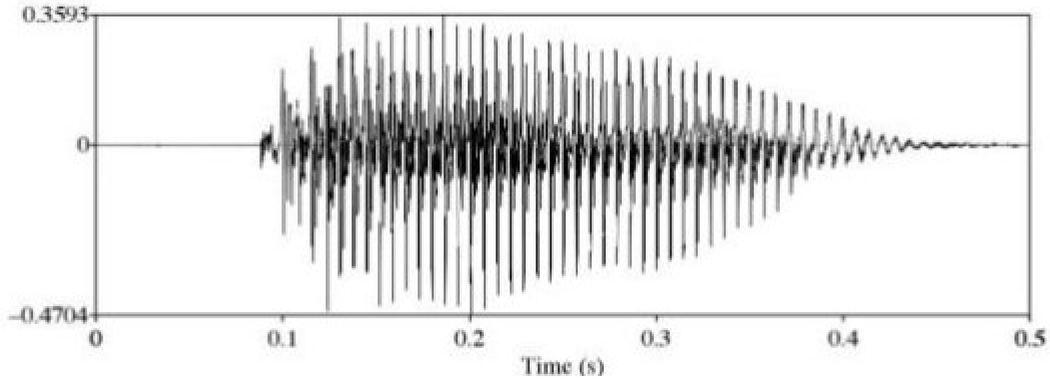


Figure 2.6: A waveform of a vowel (Ogden 2009: 30)

The spectrogram, an image of speech sound or utterance which can be displayed on a computer screen or printed on paper (Davenport and Hannahs, 2010), is another means of analysing the acoustic properties of a speech sound or an utterance. The frequency (pitch) and amplitude (intensity) of the sound, expressed in Hertz (Hz), is calculated through the number of cycles on a periodic waveform with a repeating pattern. The higher the number of cycles per second, the higher the frequency and pitch. The amplitude of the waveform, expressed in decibels (dB), explains the loudness of a sound and how much the air particles deviate. The duration (the time within which a sound is produced, usually expressed in seconds or milliseconds) is readable on the x-axis of a waveform. In a simple waveform, the number of complete repetitions, called cycles, reflects the number of times the vocal folds open within a displayed time frame. This is known as the fundamental frequency (f0), which is measured in Hertz (Hz). A frequency of 240Hz, therefore, means that the vocal folds have opened two hundred and forty times or two hundred and forty cycles have been completed per second within the waveform (Davenport and Hannahs 2010; Ladefoged and Johnson 2011).

Ogden (2009:32) posits that spectrograms provide much more complex information than what is seen on a waveform. Apart from displaying the frequency, amplitude represented by the darkness in the acoustic energy and duration of a sound, spectrograms allow us to see the high frequency energy that comes with aperiodic sounds and the appearance of periodic sounds. For transients (sounds that build up pressure behind a closure, and then has a sudden burst/release such as /p/ and /b/), the closure shows up as a blank space before a dark vertical band of acoustic energy which shows up as a spike on the waveform to represent the sudden release. Continuous sounds (voiceless fricatives such as /f/ and /s/), on the other hand, display random pattern on the waveform showing high frequency acoustic energy which is dark and intense, and therefore has high amplitude. Periodic sounds have two visual elements- vertical striations (which correspond to the opening of the vocal folds and when air flows through them every time) and formants (natural resonances of the vocal tract typical of vowels, approximants and nasals). A spectrogram showing periodic, aperiodic and transient sounds is displayed in Figure 2.5:

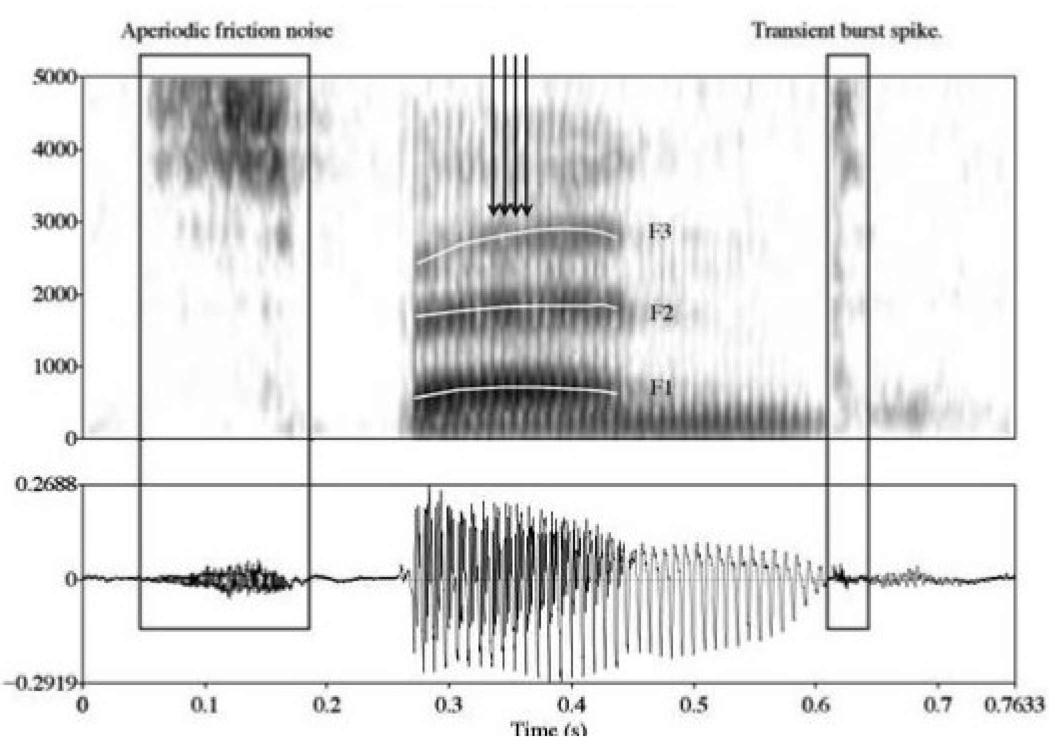


Figure 2.7: A spectrogram showing periodic, aperiodic and transient sounds (Ogden 2009: 32)

Based on its objectivity and instrumental approach, Nolan (1992) describes acoustic phonetics as the most successful branch of phonetics. This therefore underlies its adoption in this study for a corroboration of the statistical and the metrical theoretical analyses.

2.10 Theoretical framework

This study is underpinned by two theories- Liberman and Prince’s (1977)metrical phonology and Labov’s (1966) variability theory. These theories are discussed below:

2.10.1 Metrical Phonology

Metrical phonology, originally introduced as hierarchical theory of stress (Crystal, 2008:330) starting with Liberman (1975) and Liberman and Prince (1977) and further elaborated on by Halle and Vergnaud (1978) and Hayes (1981) is one of the theories which paved way for non-linear model of phonological description as a result of the inadequacy of the linear model of SPE in accounting for features beyond the segments. The theory debunked the assumption of the SPE that stress was a phonological feature given some phonetic content by means of phonetic implementation rules. The approach to stress within this framework drops the vowel inherent feature [± stress] of the linear model for a more flexible and principled description of stress in different languages. Stress, therefore, is no longer represented by means of a feature but is essentially considered to be strength relation between syllables (Gussenhoven and Haike, 2011; McMahon, 2002; Carr, 2000) against its perception as an absolute property in SPE. This theory of phonology hinges on the hierarchical notion of segment, syllable, foot and word with focus on the contrast between stressed and unstressed syllables. It sees segments as grouping into syllables; syllables into foot which is turn group into prosodic word.

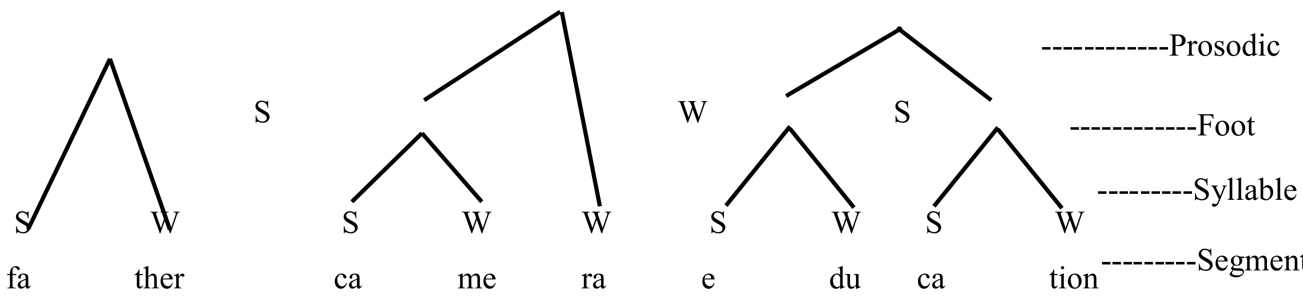
However, although the lapses of the SPE in its restriction of stress to mere feature led to the development of metrical phonology, the linearity of the SPE is still the developmental basis for metrical phonology. Goldsmith (1990:2) explains that the original justification for the theoretical changes that led to autosegmental phonology and metrical phonology were based on the arguments that made, and still make, perfect sense within the very theoretical heart of generative phonology.

The justification of this theory to the present study rests on its flexibility and principled description of stress and its location within the word or phrase rather than predictability. In metrical phonology, suprasegmental phenomenon such as stress and rhythm are represented on metrical trees or metrical grid structures (Carr, 2008:100).

2.10.1.1 The metrical tree

The underlying metrical structure of words and phrases may be represented in the form of a metrical tree whose nodes reflect the relative strength between sister constituents (Crystal, 2008:330). The metrical tree is a binary-branching structure on which stress is formally represented in metrical phonology. The representation on this tree shows one of the nodes as dominant and the other recessive labelled S and W respectively. Considering stress as a relative property, the S node is perceived to be 'stronger than an adjacent W' and the W node as 'weaker than an adjacent S' (McMahon, 2002:133; Gussenhoven and Haike, 2011:219) rather than 'strong' or 'weak'.

Metrical theory obeys the binarity constraint thus allowing only two branching nodes maximally, even in longer words, in which case a word initially branches into feet and subsequently into syllables as exemplified below:



Two rules determine the assignment of strong and weak nodes. While the Lexical Category Prominence Rule (LCPR) operates on simple and compound words, Nuclear Stress Rule (NSR) operates on phrases and sentences.

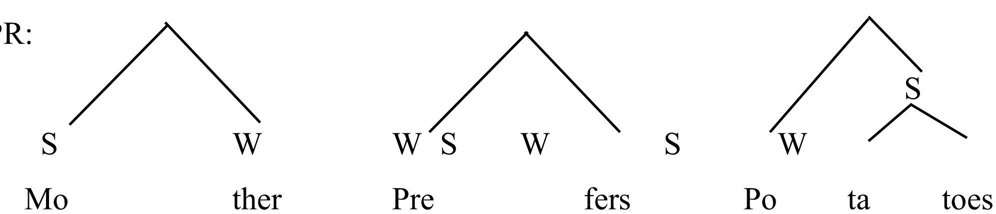
The theory, according to Liberman and Prince (1977:257), stipulates that the rules apply thus:

For any pair of sister nodes (NI, N2):

LCPR: if [N1, N2]L where L is a lexical category, then N2 is strong if (iff) N2 branches.

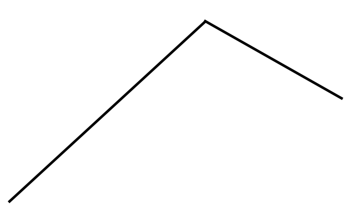
NSR: If [N1, N2]P where P is a phrasal category then N2 is strong. Both rules apply in a sentence like 'Mother prefers potatoes'. These rules are exemplified below:

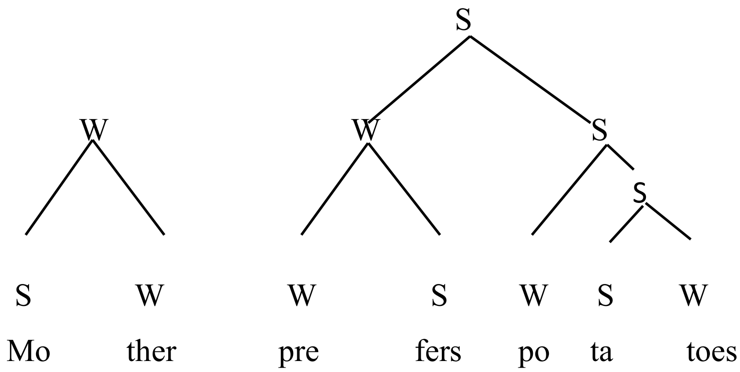
LCPR:



Because N2 branches in itself in the lexical category 'potatoes', S's occurs on the right branch.

NSR:





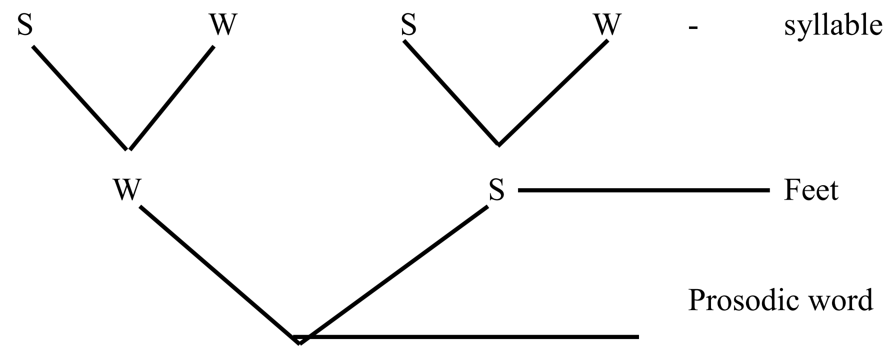
In this case, S's occur on the right branch. The syllable dominated by S's often referred to as the Designated Terminal Element (DTE), takes the nuclear stress. According to McMahon (2002:133), the metrical tree allows for easy comparison of stress patterns of related words, on the one hand, and unrelated words, on the other. It also helps in identifying the location of the main stress in longer words.

2.10.1.2 The metrical grid

Words and utterances in metrical phonology are also represented by means of metrical grid. Crystal (2008:329) defines the metrical grid as a formalism used in some approaches to metrical phonology to display hierarchic patterns of syllable prominence presented graphically in columns (for relative prominence) and rows (for rhythmical structure). Each syllable is initially assigned a position on the metrical grid. Subsequently, strong syllable progress on the grid depending on their strength relative to other adjacent syllables. A syllable is perceived to be stronger or weaker than other adjacent syllables depending on the number of grid place holder (*) it is assigned from the grid's terminal set. In other words, the more the grid placeholders, the stronger the corresponding syllable relative to other adjacent syllables. The grid for education is presented as follows:

L_3 *

L_2	*		*			
L_1	*	*	*	*		
	E	du	ca	tion	-	segment



At the terminal set of the grid (L1), each syllable is assigned a grid placeholder (*). L_2 reflects the relative strength of *e* and *ca* as opposed to *du* and *tion.* L_3 shows the relative prominence of *ca* as against *e.* Hence, the strongest syllable relative to the other adjacent syllables is *ca*. The metrical grid for *Mother prefers potatoes* is also as follows:

L_3						*	
L_2	*			*		*	
L_1	*	*	*	*	*	*	*
	Mo	ther	pre	fers	po	ta	toes

The construction of the metrical grid is determined by the Relative Projection Prominence Rule (RPPR). Liberman and Prince (1977) state that 'in any constituent in which the strong-weak relationship is defined, the Designated Terminal Element (DTE) of its strong sub constituent is stronger than the Designated Terminal Element of the weak sub constituent'. Thus *ta* which is the DTE of the stronger node is metrically stronger than *mo,* the DTE of the weaker node. The nuclear stress is therefore assigned to *ta* in *potatoes.*

Because the English language shows preference for well-formed rhythmic patterns where stressed and unstressed syllables are spaced apart at regular interval, hence its description as stress-timed, the Iambic Reversal Rule which enables the avoidance of string of stressed syllables occurring together (clash) applies as in *thir'teen 'men* to yield *'thirteen 'men*.

2.10.2 Variability theory

Variability theory as propounded by William Labov through his 1966 study, *the social stratification of English in New York City*, provides a vivid platform for language variation resulting from factors such as age, sex, social class, occupation and personality in addition to geographical origin. Through this work Labov (1966:5) established that an understanding of the speech community of an individual is a viable instrument at understanding the language of that individual using such factors as education, occupation and income which determine his social class membership. Where there is little variation in social class, Milroy (1987) finds out that the study of the network of social relationship within a group may allow for discovery of the linguistic usage among the speakers because the network of relationship individual belongs to exerts the most powerful and interesting influences on that individual's linguistic behaviour (Wardhaugh 2006:152). According to Dittmar (1976; 105), the aim of variability theory is to research into speech variation in order to describe the entire social network of speech practices and the complex competition that speakers have at their disposal for communication in correlation with the social norm parameters.

The entailments of variability theory include the following:

- All linguistic systems are functionally equivalent.
- Language systems are founded on and vary with social structure represented by social groups, institutions etc.
- Language changes in the course of history.
- The knowledge of social norms which define the appropriateness of linguistic variance for different speakers is crucially relevant to an evaluation of social information carried by an utterance.
- Standard, regional, social and functional varieties are distinguishable varieties used for linguistic investigation.
- A corpus-based method of linguistic analysis.

A major strength of Labov's variability theory lies in its descriptive approach to sociolinguistics in line with structuralism where the principle is rather empirical than normative (prescriptive) nature of traditional linguistics. The study of language is based on empirical principles with the data showing the actual use to which a language is put rather than its prescribed roles thereby perceiving of all languages as functional. Adopting this approach, Labov's variability theory sets the pattern for quantitative studies of linguistic variation (Wardhaugh 2006:164). This theory has also been found to be applicable to a wide range of topics in sociolinguistics- languages in contact, language change, dialectology, language attitude, code mixing and code switching, bilingualism and more

This theory is pertinent to the present study as it establishes objective distribution of linguistic features and delineates social groups on the basis of such features.

CHAPTER THREE
RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the research methodology employed in this study. It embodies the research design, target population, sampling technique and sample, instrumentation, the method of data collection and method of data analysis.

3.1 Research design

The study established the impact of technology-driven facilities to which teenage undergraduates of the University of Ibadan are exposed and through which they come in contact with native English and their use of Standard English stress and rhythm. The study of their linguistic performance was aimed at determining whether or not accentuation from such facilities as electronic media sources (radio and television stations) such as British Broadcasting Corporation (BBC), Cable Network News (CNN), Cartoon Network (CN), Mnet Series, Mnet Action, Mnet Premier, BBC Entertainment; interactive computer games, internet sites and links with speech drills, telephony hardware and software for live conversation with native speaker and web-based video conferencing; social network sites such as Facebook, Twitter, Google plus and more; dictionaries with audio aids; computerised speech laboratory as well as British and American films can serve as alternative model of appropriate pronunciation in Nigeria.

Three hundred teenage undergraduates of the university were selected for the study. The selected participants were first-year and second-year undergraduates who satisfied all the criteria for participation based on their responses to the participant's eligibility section of the questionnaire that was administered on the them. The eligibility criteria include being a Nigerian teenager of Yoruba origin and L_1 speaker of the English language, born and nurtured in Nigeria and not having lived in a native English speaking country. The second section of the questionnaire was used to ascertain the level of exposure of the selected participants to the technology-based non-enculturation sources of contact with native English. The participant produced a semi-spontaneous speech with which their ability to approximate Standard English stress and rhythm was elicited. The research analysis was both quantitative and qualitative. The quantitative aspect of the analysis included counting tokens of appropriate productions,conversion to simple percentages and use of mean score, standard deviation and analysis of variance (ANOVA) to test each of the hypotheses. The metrical and acoustic analyses formed the qualitative analysis.

3.2 Target population

The target population of the study, on a large scale, is Educated Yoruba teenagers. However, based on constraints of logistics and the need to achieve an empirically effective coverage in the investigation, the geographical coverage was narrowed to University of Ibadan. Sample population was chosen among first-year and second-year students of the institution who hail from the southwestern states of the nation.

3.3 Sampling technique and sample

Criterion sampling technique was used for selecting the participants for the study. The participants of the research comprising three hundred teenagers who were drawn from a common ethnic background were all educated and of Yoruba origin. The participants were all teenagers who have not lived in countries where English is a native language but are exposed to English as their first language. Hence, with regard to such variables as ethnicity, education, first language and age, they constitute a homogenous sociolinguistic group. The choice of this homogenous group is in a bid to avoid any potential difficulty that may be posed by extraneous factors such as diverse mother tongue influences, thus, invalidating the findings of the study. They are however stratified into three groups- High Technology Contact (HTC), Mid Technology Contact (MTC) and Low Technology Contact (LTC)- on the basis of their exposure to technology-based non-enculturation sources of standard spoken English for non-native speakers of the English language. A native British speaker of the English language born, nurtured and currently living in London served as the native baseline, against which the productions of the research group was juxtaposed for observable differences.

3.4 Instrumentation

There were two instruments for the research. The first is a questionnaire which was used to ascertain the eligibility of the participants and determine their level of exposure to electronic media sources, internet sites and links with speech drills, telephony hardware and software for live conversation with native speaker and web-based video conferencing social network sites, dictionaries with audio aids; computerised speech laboratory as well as British and American films. The second is the English Stress and Rhythm Competence Test (ESRCT), a validated prepared text for eliciting semi-spontaneous speech, which was used to test the English stress and rhythmic patterns of the participants. Both instruments were intended to establish the impact of participants' exposure to technology-based non-enculturation sources of language acquisition and English pronunciation of the participants, with particular reference to stress and rhythm.Having administered the questionnaire on the participants to ascertain their eligibility for the study and establish their level of technology exposure, the ESRCT, infused with words and structures to reveal their approximation to Standard English stress and rhythmwas administered on them to elicit semi-spontaneous speech. The text was prepared in a way that the participants were not aware of the spoken English features being investigated.

The frequencies of contexts involving the use of English stress and rhythm were designed to cover the eight hypotheses. Sixty-two tokens were tested. This figure multiplied by 300 (number of the participants) resulting in a total of 18,600 occurrences of appropriate stress and rhythm use was anticipated. This was so designed in order to facilitate empirical analyses of the data. The UIYTUs' individual productions of the text were played back and subjected to analyses through the use of computerised speech filing laboratory, WASP/SFS version 1.54. The production of a Briton, who was born, nurtured and currently living in London was used as a native baseline for assessing the UIYTUs' level of approximation to the Standard British English pronunciation.

3.5 Validation of instruments

The instruments designed for the study were presented to the supervisor of the research who also proofread it, made necessary corrections and added her informed suggestions. Experts in statistics were also contacted to establish the appropriateness of the tool to this sort of research. The necessary correction made by the supervisor were effected by the researcher and the final configuration of the research instrument was then presented to the research supervisor who certified it valid for the study.

3.6 Method of data collection

The research instruments were administered personally by the researcher on the participants (University of Ibadan Yoruba teenage undergraduates) whose consent were sought.Research colleagues also assisted in the data gathering. Appointments were negotiated, where necessary, with the participants in order to obtain their data in an environment that was conducive and with minimal noise interference. The participants were first required to respond to the technology-based non-enculturation sources questionnaire. This helped the researcher to establish their eligibility for participating in the study and ascertain their level of technology exposure. Eligible participants were thereafter made to read the validated text into a personal computer system equipped with Speech Filing System(SFS/WASP) version 1.54 with sound filtering application which recorded and filtered the semi-spontaneous productions of the participants. Their productions formed the data for the study. The productions of the participants were scored as appropriate or inappropriate based on their proximity to or deviation from the productions of a native British speaker of the English language who served as the baseline.

3.7 Method of data analysis

The data analysis is both quantitative and qualitative. To provide answers to the questions and test the hypotheses that were formulated, data collected through the technology-based non-enculturation sources questionnaire (TNSQ) was used to generate technology contact (TC) levels. The TC levels were generated using themean score and the standard deviation of participants' response to the use of electronic media sources, internet sites and links with speech drills, telephony hardware and software for live conversation with native speaker and web-based video conferencing, social network sites, dictionaries with audio aids, computerised speech laboratory, interactive computer games and British and American films. The mean rating and the standard deviation (SD) were 58.15 and 24.89 respectively. The SD was divided by 2 and added to or subtracted from the mean to obtain the mid TC level (MTC = 58.15 ± 12.45), rounded off to the nearest whole number. Hence, participants whose exposure to the technology-based non-enculturation sources were rated between 47 and 71 were categorised as the middle group. Those with 0-46 and 72-100 were categorised as low and high respectively.

The UIYTUs' productions of the text in the English Stress and Rhythm Competence Test (ESRCT) were played back, scored (based on the native baseline production) and were subjected to statistical, metrical and acoustic analyses. The data was quantitatively analysed using descriptive and inferential statistics. This analysis was done in two parts. In the first part, one (1) mark was awarded for each instance of the appropriate pattern by the participants. Frequencies (tokens) of perceived UIYTUs' productions were first counted and converted to simple percentages before using mean score, standard deviation and analysis of variance (ANOVA) with post-hoc test for multiple (between-group) comparison, setting alpha at 95% confidence interval to test each of the hypotheses. The second part of the statistical analysis presented the analysis of variance for the pitch (Hz) and duration (ms) readings (extracted from SFS (WASP) version 1.54 with which the recording was done) of the appropriate syllables of selected expressions produced by UIYTUs. This was aimed at augmenting the findings of the earlier analysis which was done with figures obtained based on the researcher's perception of the words/expressions produced by the UIYTUs.

Liberman and Prince's metrical phonology was the representational basis of the metrical analysis. This theoretical analysis was done using the Lexical Category Prominence Rule (LCPR) at the word level and the Nuclear Stress Rule (NSR) in phrasal categories. Metrical grids were deployed as formalism to explain the stress and rhythmic patterns by revealing the underlying structure of the utterances tested and show the alternation of strong and weak syllables. The dominant patterns of the different technology contact groups were noted and compared with those of the native baseline. The acoustic analysis was done to corroborate the statistical and metrical analyses. through a comparison of the of the pitch prominence (expressed in Hertz), waveforms of the native baseline and samples of the dominant research participants' waveforms for objective conclusion.

CHAPTER FOUR
DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Introduction

Eight research questions and hypotheses were formulated toestablish the influence of University of Ibadan Yoruba Teenage Undergraduates' (UIYTUs') exposure to technology-based non-enculturation sources of contact with native English on their approximation to native English stress and rhythm. To provide answers to these questions and test the hypotheses, data collected through the technology-based non-enculturation sources questionnaire (TNSQ) was used to generate technology contact (TC) index. The TC index was generated based on the exposure to and use of electronic media sources (radio and television stations such as BBC, CNN, Mnet Series etc., internet sites and links with speech drills, telephony hardware and software for live conversation with native speaker and web-based video conferencing, social network sites such as Facebook, Twitter, Google plus and more, dictionaries with audio aids, computerised speech laboratory, interactive computer games and British and American films. The technology contact index was divided into levels: L1 = Low, L2= Mid and L3= High. The UIYTUs' production of the English stress and rhythm (ESR) test used for the study was analysed using Statistical Package for Social Statistics (SPSS) version 21 One-way Analysis of Variance (ANOVA) with post-hoc test, setting alpha at 95% confidence interval. The results are presented below:

4.1 Statistical analysis

The statistical analysis is done in two parts. In the first part, frequencies (tokens) of perceived UIYTUs' productions are first counted and converted to simple percentages before using mean score, standard deviation and analysis of variance to test each of the hypotheses. Scheffe Post Hoc tests are conducted for multiple (between-group) comparisons among the groups. Graphical illustrations of the percentage of appropriate rendition and the mean performance for the three levels of TC are thereafter presented. The second part of the statistical analysis presents the analysis of variance for the pitch (Hz) and duration (ms) readings (extracted from SFS/WASP version 1.54 with which the recording was done) of the appropriate syllables of selected expressions produced by UIYTUs. This is necessitated by the need for objectivity, especially as the initial part of the analysis is based on the researcher's perception.

4.1.1 Statistical analysis of UIYTUs' polysyllabic word stress assignment

Hypothesis one

There is no significant difference in the assignment of stress to English polysyllabic words by University of Ibadan Yoruba teenage undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

In order to test the hypothesis above, data obtained through the polysyllabic word stress assignment test- pe'destrian, uni'versity, con'glomerate, congratu'lations, peculi'arity- were analysed using simple percentages and ANOVA. The results are presented in tables and figures and discussedbelow.

Table 4.1: Frequency and percentage of UIYTUs' assignment of stress on polysyllabic words

	Low		Mid		High	
Words	**Appr. stress Assg.**	**Inappr. stress assg.**	**Appr. stress Assg.**	**Inappr. stress assg.**	**Appr. stress Assg.**	**Inappr. stress assg.**
Pe'destrian	57 (34.7)	107 (65.3)	40 (56.3)	31 (43.7)	52 (80)	13 (20)
Uni'versity	123 (75)	41 (25)	64 (90.1)	7 (9.9)	61 (93.8)	4 (6.2)
Con'glomerate	64 (39)	100 (61)	49 (69)	22 (31)	57 (87.7)	8 (12.3)
Congratu'lations	129 (78.7)	35 (21.3)	67 (94.4)	4 (5.6)	62 (95.3)	3 (4.7)
Peculi'arity	33 (20.1)	131 (79.9)	44 (61.9)	27 (38.1)	49 (75.4)	16 (24.6)

Appr. - appropriate Inappr. - Inappropriate Assg. - Assignment
*Percentages are written in parenthesis.

The result presented in Table 4.1 above shows the frequency and percentage of appropriate and inappropriate assignment of stress on English polysyllabic words among University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with different levels of technology exposure. Of the 164 respondents with low technology contact (LTC), only 34.7 percent were able to assign stress appropriately to *pedestrian*. Among the MTC, 56.3% stressed *pedestrian* appropriately while 80%

appropriate stress assignment was realised in the speech of the HTC. For *university,* 75% of the LTC, 90.1% of the MTC and 93.8% of the HTC stressed *university* appropriately. *Conglomerate* was appropriately stressed by 39% of the LTC, 69% of the MTC and 87.7% of the HTC. For *congratulations,* the stress was appropriate assigned by 78.7% of the LTC, 94.4% of the MTC and 95.3% of the HTC. Standard stress assignment on the appropriate syllable of *peculiarity* was realised in the production of 20.1% of the LTC, 61.9% of the MTC and 75.4% of the HTC. Percentage of UIYTUs' appropriate stress assignment on polysyllabic words is graphically represented in Figure 4.1 below:

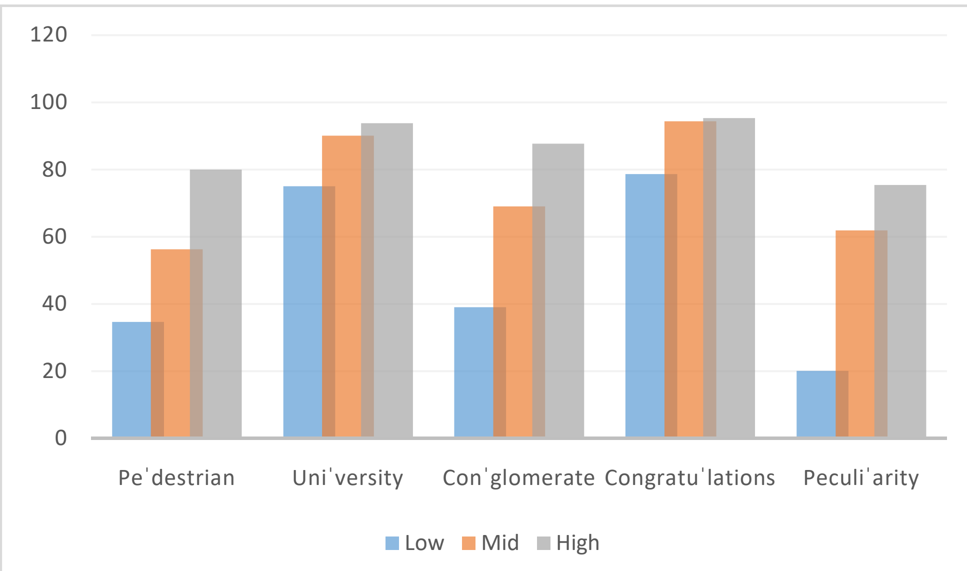


Figure 4.1: Percentage of appropriate stress assigned on polysyllabic words by UIYTUs

The graph above shows the percentage of appropriate stress assigned on polysyllabic words-*pedestrian, university, conglomerate, congratulations* and *peculiarity*- by UIYTUs. It is evident from the bars that, as technological exposure increases, the approximation of the participants to the native forms increases. The difference in their performance is, however, more evident in *pedestrian, conglomerate* and *peculiarity* among the three groups than it is in *university* and *congratulations*, especially between participants in the mid and high categories.

Table 4.2: Analysis of variance for UIYTUs' polysyllabic word stress assignment

Level of technology contact	N	Mean	Std. deviation		
Low	164	4.87	2.85		
Mid	71	7.31	2.39		
High	65	8.58	2.28		
Total	300	6.25	3.06		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	748.234	2	374.117	53.99	.000
Within Groups	2058.016	297	6.929		
Total	2806.250	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.2 shows the result of the analysis of variance for stress on English polysyllabic words as were assigned by UIYTUs with low, mid and high technology contact. While there was 4.87 mean appropriate stress assignment on the polysyllabic words in the productions of the LTC, the MTC had a mean appropriate stress assignment of 7.31 and the mean for the HTC was 8.58. Total mean of the 300 research participants was 6.25. The result shows that the influence of technology contact on polysyllabic word stress assignment by UIYTUs is statistically significant [$F_{(2, 297)} = 53.99$; $p < .05$]. By this result, the null hypothesis which states that there is no significant difference in the assignment of stress to English polysyllabic words by University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) is rejected.

Table 4.3: Multiple (between-group) comparison for UIYTUs' polysyllabic word stress assignment

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Low	Mid	-2.44*	.37	.000	-3.36	-1.52
	High	-3.79*	.39	.000	-4.67	-2.77
Mid	Low	2.44*	.37	.000	1.52	3.36
	High	-1.28*	.45	.020	-2.39	-.16
High	Low	3.72*	.39	.000	2.77	4.67
	Mid	1.27*	.45	.020	.16	2.39

*. The mean difference is significant at the 0.05 level.

As three groups of participants are being compared, it is pertinent to compare the groups in pairs in order to establish where exactly the earlier established significant difference(s) is/are. Table 4.3 shows the result of the multiple comparison test for UIYTUs' assignment of stress to English polysyllabic words. The table reveals that stress assignment to English polysyllabic words in the speeches of UIYTUs with high technology contact (HTC) was significantly better than that of UIYTUs with mid technology contact (MD = 1.27; $p < .05$). Also, the performance of UIYTUs with mid technology contact was significantly better than that of UIYTUs with low technology contact (MD = 2.44; $p < .05$). Therefore, the established significant differences exist among the three levels of technology contact. The homogeneous subsets in Table 4.4 below categorises UIYTUs for word stress assignment.

Table 4.4: Homogenous subset- categorisation of UIYTU for polysyllabic word stress

Scheffe[a,b]

Level of technology contact	N	Subset for alpha = 0.05		
		1	2	3
Low	164	4.87		

Mid	71		7.31	
High	65			8.59
Sig.		1.000	1.000	1.000

Results as displayed in Table 4.4 implies that UIYTUs with low technology contact (LTC) are dissimilar to UIYTUs with mid technology contact (MTC) who are in turn different from UIYTUs with high technology contact (HTC). The three groups therefore belong to different subsets based on their performance in the assignment of stress to the appropriate syllables of English polysyllabic words. The participants' performance is illustrated in Figure 4.2 below:

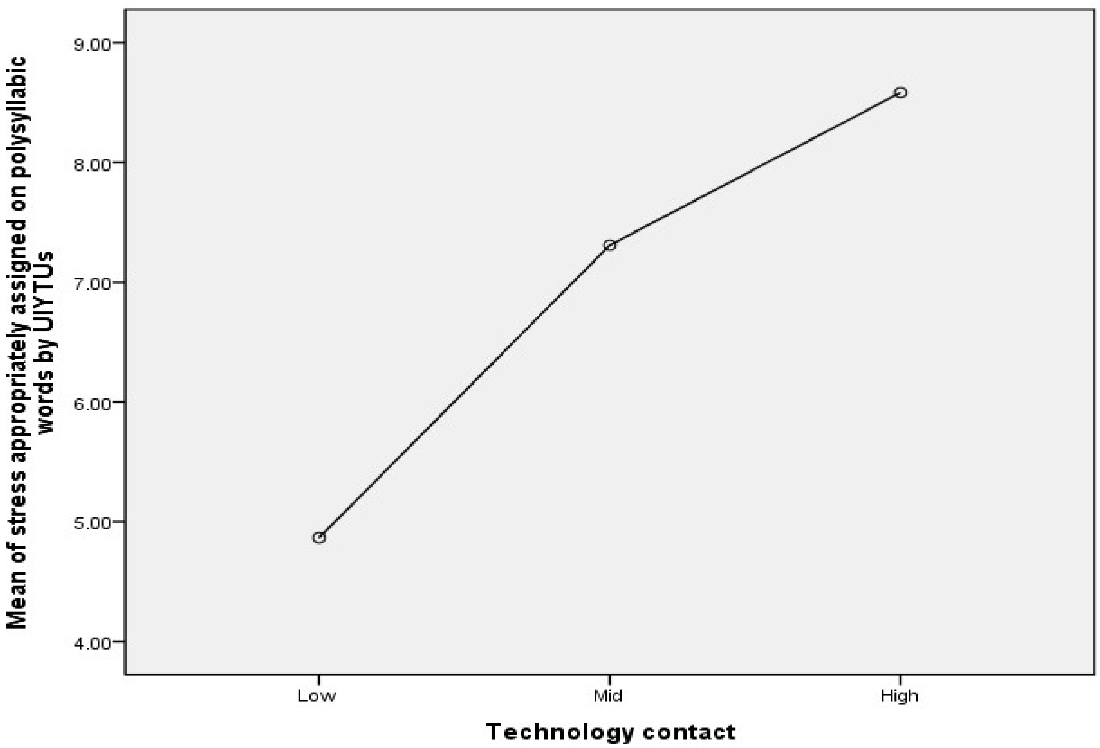


Figure 4.2: Mean of stress appropriately assigned on polysyllabic words by UIYTUs

Figure 4.2 shows the mean of appropriate stress on English polysyllabic words by UIYTUs. The graph goes up, showing that appropriate assignment of stress on polysyllabic words increases as technology contact level increases.

4.1.2 Statistical analysis of UIYTUs' compound noun and phrase differentiation using stress

Hypothesis two: The use of stress to differentiate between compound nouns and phrases in the English speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) is not significantly different.

As part of the English Stress and Rhythm (ESR) test, UIYTU were made to produce utterances whose grammatical designations (compound nouns and phrases) and meanings are distinguished by stress. Frequencies of appropriate and inappropriate assignment of stress were first counted and converted to simple percentages before one-way analysis of variance (ANOVA) was used to establish any significant difference(s). Results are presented in tables and figures. The findings are discussed below.

Table 4.5: Frequency and percentage of UIYTUs' compound noun and phrase differentiation using stress

	Low		**Mid**		**High**	
Utterance	**Stress diff.**	**Non-diff.**	**Stress diff.**	**Non-diff.**	**Stress diff.**	**Non-diff.**
ˈBlackbird/black ˈbird	9 (5.5)	155 (94.5)	11 (15.5)	60 (84.5)	33 (50.7)	32 (49.3)
ˈLightship/light ˈship	13 (7.9)	151 (92.1)	10 (14.1)	61(85.9)	31 (47.6)	34 (52.4)
ˈSend-off/send ˈoff	28 (23.2)	136 (76.8)	22 (30.9)	49 (69.1)	36 (55.3)	29 (44.7)
ˈCover-up/cover ˈup	19 (11.5)	145 (88.5)	8 (11.3)	63 (88.7)	29 (41.5)	38 (58.5)
ˈPrintout/print ˈout	8 (4.9)	156 (95.1)	11 (15.5)	60 (84.5)	30 (46.2)	35 (53.8)

Diff.- differentiation
* Percentages are written in parenthesis.

Findings presented in Table 4.5 above show the appropriate stress differentiation and non-differentiation of five compound nouns and phrases tested in the speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs). As compound nouns, the primary stress of *blackbird, lightship, send-off, cover-up* and *printout* are expected to be assigned to the first syllables while they are assigned to the second or third syllables as phrasal structures. However, in the productions of the LTC, only 5.5% of the 164 respondents distinguished *blackbird* (compound noun) from *black bird* (noun phrase) using stress. Of the 71 MTC, 15.5%differentiated the utterances appropriately while 50.7% of the 65 HTC were able to correctly assign stress to the utterances as expected. For *ˈlightship* and *light ˈship,* only 7.9% appropriate stress differentiation were realised in the speeches of the LTC. The MTC had 14.1% appropriate differentiation, while the HTC distinguished in 47.6% instances. Standard stress distinction between ˈ*send-off* and *send* ˈ*off* was realised in 23.2% of the LTC production, 30.9% of the MTC and 55.3% of the HTC. Appropriate stressing of ˈ*cover-up* and *cover* ˈ*up,* was produced by 11.5% of the LTC, 30.9% of the MTC and 41.5% of the HTC. Only 4.9% of the LTC differentiated between ˈ*printout* and *print* ˈ*out* using stress. Stress differentiation of the two utterances was done by 15.5% of the MTC and 46.2% of the HTC as expected. Percentage of appropriate stress differentiation of the compound nouns and phrases as produced by UIYTUs is presented graphically in Figure 4.3 below:

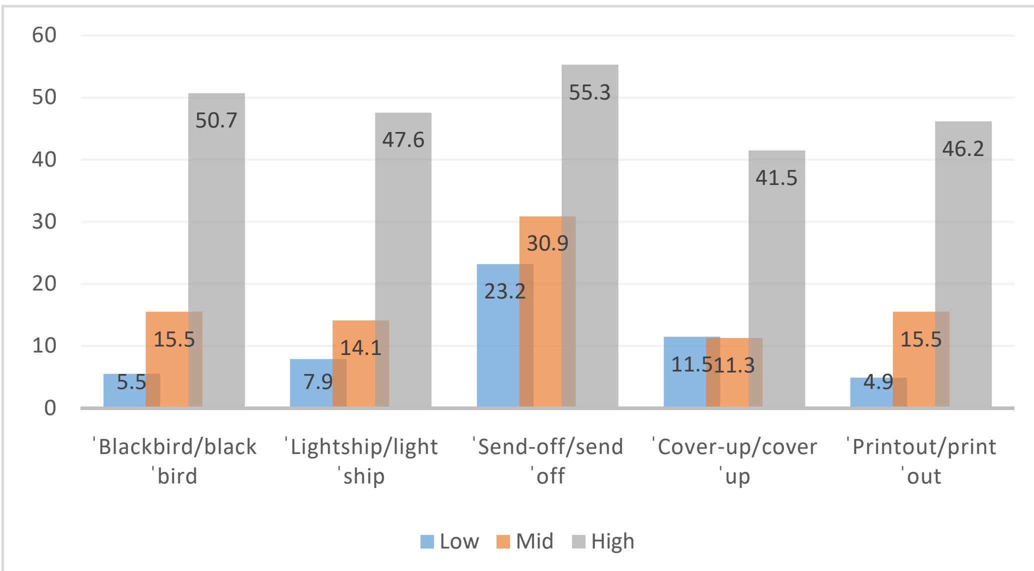


Figure 4.3: Percentage of appropriate stress differentiation of compound nouns and phrases by UIYTUs

Figure 4.3 shows the percentage of appropriate stress differentiation of compound nouns and phrases by UIYTUs. The closeness of the bars of the participants with low and mid technology contacts graphically reveals that the participants with mid technology contact did not significantly differentiated compound nouns from phrases using stress better than those with low technology contact. Although participants with high technology contact assigned remarkably better than the low and mid categories, the highest percentage of approximation to the native form is 55.3% realised in *send-off/send off,* thereby revealing their limited knowledge about using stress to distinguishing between lexical (compound) and phrasal categories

Table 4.6: Analysis of variance for UIYTUs' stress differentiation between compound nouns and phrases

Level of technology contact	N	Mean	Std. deviation		
Low	164	.94	1.95		
Mid	71	1.75	2.30		
High	65	4.74	3.42		
Total	300	1.95	2.84		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	675.966	2	337.983	57.84	.000
Within Groups	1735.381	297	5.843		
Total	2411.347	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.6 presents the result of ANOVA to establish significant difference in UIYTUs' use of stress to distinguish between compound nouns and phrases. The LTC had 0.94 mean stress distinction between compound nouns and phrases. The MTC had a mean performance of 1.75 while the HTC mean appropriate distinction was 4.74. Total mean of all the participants' productions was 1.95. Given $F_{(2, 297)} = 57.84$; $p < .05$, level of technology contact influences the extent to which UIYTUs are able to use stress to distinguish between compound nouns and phrases. Therefore, the null hypothesis which states thatthe use of stress to differentiate between compound nouns and phrases in the English speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTU) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) is not significantly different is rejected.

Table 4.7: Multiple (between-group) comparison for UIYTUs' stress distinction between compound nouns and phrases

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Low	Mid	-.81	.34	.065	-1.65	.04
	High	-3.80*	.35	.000	-4.67	-2.93
Mid	Low	.81	.34	.065	-.04	1.65
	High	-2.99*	.41	.000	-4.01	-1.97
High	Low	3.80*	.35	.000	2.93	4.67
	Mid	2.99*	.41	.000	1.97	4.01

*. The mean difference is significant at the 0.05 level.

Having established significant differences in participants' use of stress to distinguish between compound nouns and phrases, Scheffe post-hoc test was conducted to ascertain between-group significant differences. The result as presented in Table 4.7 above reveals that the HTC significantly differ from the MTC in their use of stress to differentiate between compound nouns and phrases (MD = 1.99; p <.05). Also, the performance of the HTC is significantly better than that of the LTC (MD = 3.79; p <.05). The performance of the MTC and that of the LTC did not reveal any statistically significant difference (MD = 0.81; p <.05). The MTC however performed better than the LTC.

Table 4.8: Homogenous subset- categorisation of UIYTUs for stress distinction between compound nouns and phrases

Scheffe[a,b]

Level of technology contact	N	Subset for alpha = 0.05	
		1	2
Low	164	.94	
Mid	71	1.75	
High	65		4.74
Sig.		.097	1.000

Results displayed in Table 4.8 shows that UIYTUs with low technology contact were similar to those with mid technology contact as the difference in their use of stress to distinguish between compound nouns and phrases is not statistically significant. Participants of both technology contact levels therefore belong to the same subset. Since the difference between UIYTUs with high technology contact and the other two groups is statistically significant, participants with high technology contact belong to a different subset. Figure 4.4 below illustrates their performance.

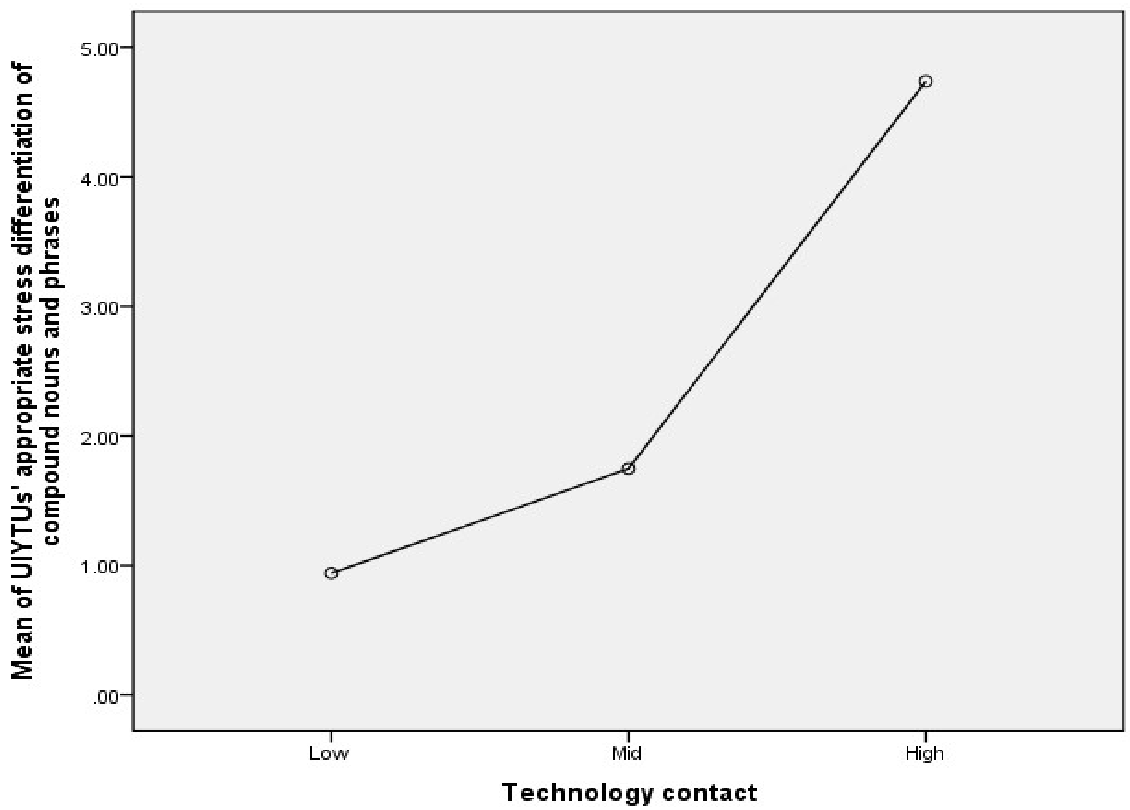


Figure 4.4: Mean of UIYTUs' appropriate stress differentiation of compound nouns and phrases

The figure above shows the extent to which UIYTUs of the three technology contact were able to distinguish between compound nouns and phrases. The upward movement of the graph shows that the UIYTUs with high technology differentiated much better than the other the other two TC levels. The point of the mid TC on the graph reflects that they performed better than UIYTU with low technology contact. The distance between the mid and the low points, however, shows the closeness of the mean performance of both groups.

4.1.3 Statistical analysis of UIYTUs' nuclear stress assignment

Hypothesis three: There is no significant difference in the assignment of nuclear stress to appropriate syllable of English sentences by University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

Five simple sentences were tested in the speeches of UIYTUs of the three levels of technology contact to correlate their technology exposure and use with their ability to assign stress to the Designated Terminal Element (DTE) of English phrasal structures for any significant differences. The frequency and percentage of their assignment and non-assignment of nuclear stress to English sentences are first presented in Table 4.9 and the percentage assignment of stress is graphically illustrated in Figure 4.5 before analysis of variance, presented in Tables 4.10, 4.11 and 4.12 were conducted for significant differences.

Table 4.9: Frequency and percentage of UIYTUs' assignment of nuclear stress to English sentences

	Low		**Mid**		**High**	
Utterance	**Assg. of nuclear stress**	**Non-assg. of nuclear stress**	**Assg. of nuclear stress**	**Non-assg. of nuclear stress**	**Assg. of nuclear stress**	**Non-assg. of nuclear stress**
There could be a bit of rain at the end of the morning.	49 (29.9)	115 (70.1)	36 (50.7)	35 (49.3)	48 (73.8)	17 (26.2)
You must come over for dinner.	66 (40.2)	98 (59.8)	52 (73.2)	19 (26.8)	59 (90.7)	6 (9.3)
We could talk about it at lunch.	46 (28)	118 (72)	40 (56.3)	31 (43.7)	53 (81.5)	12 (18.5)
Ask them to come to the party.	54 (32.9)	110 (67.1)	44 (61.9)	27 (38.1)	58 (89.2)	7 (10.8)
There should be some more in the box	29 (17.7)	135 (82.3)	30 (42.3)	41 (57.7)	52 (80)	13 (20)

Assg.- assignment *Percentages are written in parenthesis.

Table 4.9 above shows the frequency and percentage assignment and non-assignment of nuclear stress on the DTE of English sentences produced by UIYTUs. Of the 164 respondents with low technology contact, only 29.9% assigned the nuclear stress appropriately to *mor-* in*There could be a bit of rain at the end of the ˈmorning.* Among the MTC, 50.7% stressed the DTE appropriately 73.8% appropriate stress assignment was realised in the rendition of the HTC. For *You must come over for ˈdinner*,40.2% of the LTC assigned stress appropriately. Of the MTC, 73.2% stressed the DTE correctly while 90.7% appropriate stress assignment was realised in the speeches of the HTC. *We could talk about it at ˈlunch* had 28% appropriate stress assignment in the speeches of the LTC, 69% appropriate assignment in the speech of MTC and 81.5% appropriate stress assignment in the production of the HTC. For the production of *Ask them to come to the ˈparty,* 32.9% of the LTC, 61.9% of the MTC and 89.2% of the HTC assigned nuclear stress appropriately. The respective percentages of standard assignment of nuclear stress on the appropriate syllable of *There should be some more in the ˈbox* among the LTC, the MTC and the HTC are 17.7%, 42.3% and 80%. Percentage of nuclear stress appropriately assigned to English sentences by UIYTUs is graphically represented in Figure 4.5 below:

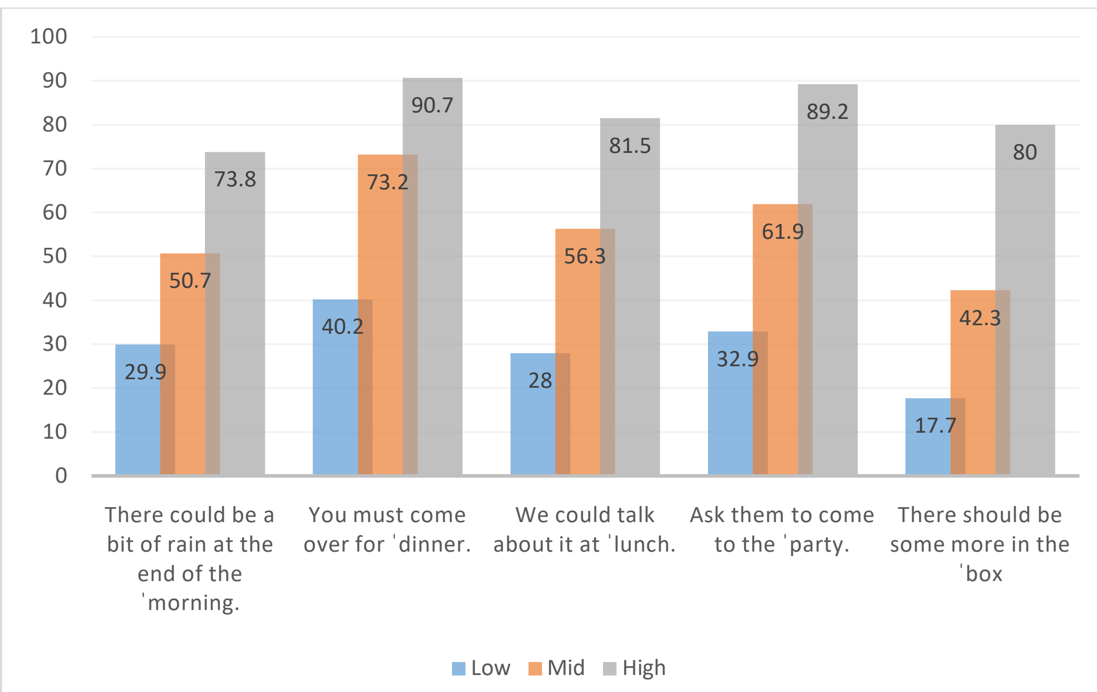


Figure 4.5: Percentage of nuclear stress appropriately assigned to English sentences by UIYTUs

The percentage of nuclear stress appropriately assigned to five English simple sentences by UIYTUs is graphically presented in Figure 4.5. Evidently, from the graph, the higher the level of technology contact, the higher the approximation to native English assignment of nuclear stress to appropriate syllables of simple sentences.

Table 4.10: Analysis of variance for UIYTUs' nuclear stress assignment

Level of technology contact	N	Mean	Std. deviation		
Low	164	2.94	3.30		
Mid	71	5.63	3.61		
High	65	8.34	3.17		
Total	300	4.75	3.99		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	1430.324	2	715.162	63.78	.000
Within Groups	3330.423	297	11.214		
Total	4760.747	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Result of ANOVA for nuclear stress assignment to the appropriate syllables of five sentences by UIYTUs as presented in Table 4.10 shows that the LTC had 2.94 mean nuclear stress assignment while the MTC had 5.36 mean appropriate assignment of nuclear stress. The mean performance realised for the HTC was 8.34. Mean performance for the 300 UIYTUs was 4.75. The result shows that the difference in UIYTUs' ability to assign nuclear stress to the appropriate syllables of the sentences based on their level of technology exposure is statistically significant [$F_{(2, 297)} = 63.78$; $p < .05$]. Based on this result, the null hypothesis which states that there is no significant difference in the assignment of nuclear stress to the appropriate syllable of English sentences by UIYTUs with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) is rejected while the alternate hypothesis is retained.

Table 4.11: Multiple (between-group) comparison for UIYTUs' nuclear stress assignment

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Low	Mid	-2.70*	.48	.000	-3.87	-1.52
	High	-5.40*	.49	.000	-6.61	-4.19
Mid	Low	2.70*	.48	.000	1.53	3.87
	High	-2.71*	.58	.000	-4.12	-1.29
High	Low	5.40*	.49	.000	4.19	6.61
	Mid	2.71*	.58	.000	1.29	4.12

*. The mean difference is significant at the 0.05 level.

Result of the between-group comparison test reveals that the UIYTUs with high technology contact assigned nuclear stress to the appropriate syllables of the sentences significantly better than the UIYTUs with mid technology contact (MD = 2.70; $p < .05$) and the UIYTUs with low technology contact (MD = 5.39; $p < .05$). Also, the performance of UIYTUs with mid technology contact was significantly better than that of UIYTUs with low technology contact (MD = 2.69; $p < .05$). Therefore, established significant differences exist among the three levels of technology contact for assignment of nuclear stress to appropriate syllable of English sentences. Table 4.12 below presents the homogeneous subsets for nuclear stress assignment.

Table 4.12: Homogenous subset- categorisation of UIYTU for nuclear stress assignment

Scheffe[a,b]

Level of technology contact	N	Subset for alpha = 0.05		
		1	2	3
Low	164	2.94		
Mid	71		5.63	
High	65			8.34
Sig.		1.000	1.000	1.000

Results as displayed in Table 4.12 shows that UIYTUs with low technology contact are dissimilar to UIYTUs with mid technology contact who are, in turn, different from UIYTUs with high technology contact. The three groups can therefore belong to distinctive categories based on their performance in the assignment of nuclear stress to English sentences. The participants' performance is illustrated in Figure 4.6 below:

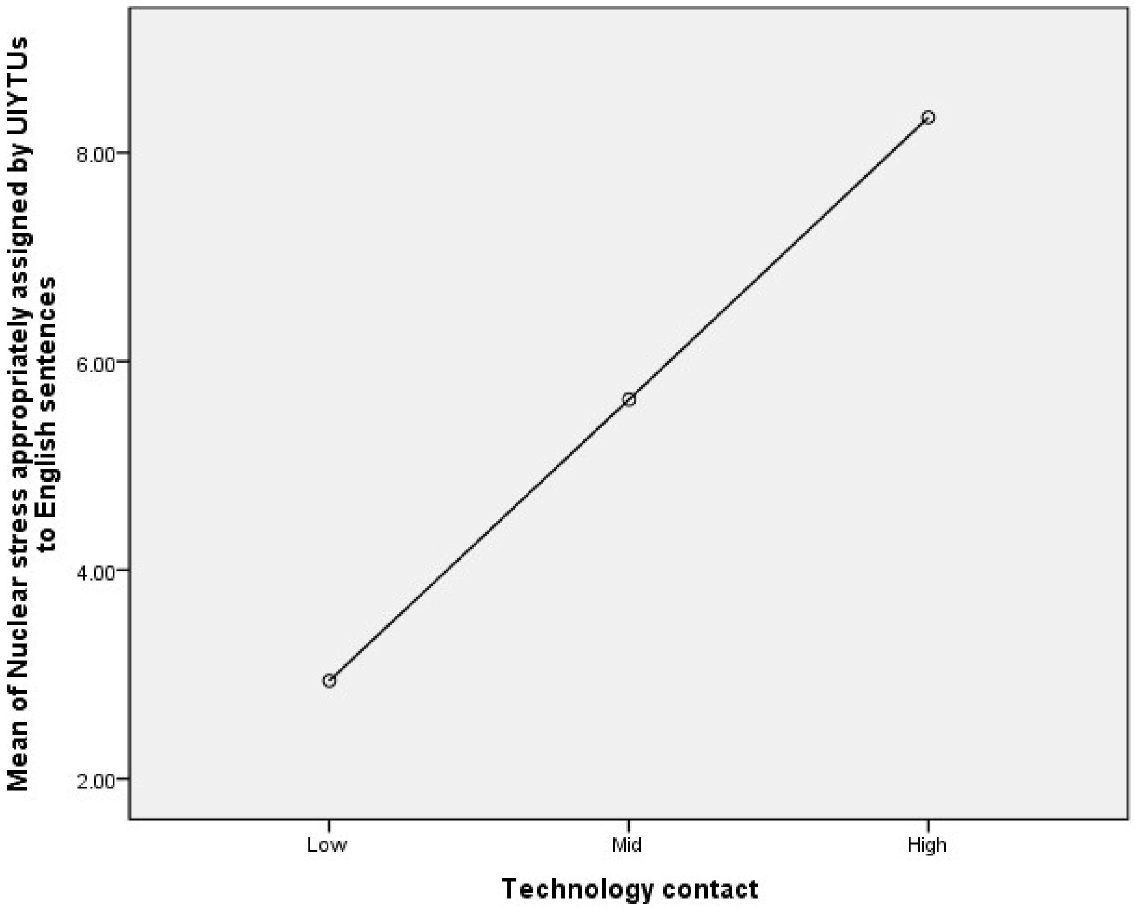


Figure 4.6: Mean of Nuclear stress appropriately assigned by UIYTUs to English sentences

The graph in Figure 4.6 ascends to show that exposure to technological facilities which make nativeEnglish accessible to UIYTUs positively influence their assignment of nuclear stress to English phrasal structures.

4.1.4 Statistical analysis of UIYTUs' contrastive stress assignment

Hypothesis four: University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) do not vary significantly in the reassignment of nuclear stress to focused words for contrastive purposes.

Table 4.13: Frequency and percentage of UIYTUs' nuclear stress reassignment

	Low		Mid		High	
Utterance	**Stress reassg.**	**Non-reassg.**	**Stress reassg.**	**Non-reassg.**	**Stress reassg.**	**Non-reassg.**
That was a **great** idea.	76 (46.3)	88 (53.7)	55 (77.5)	16 (22.5)	56 (86.1)	9 (13.9)
He **bought** a black car.	54 (32.9)	110 (67.9)	44 (61.9)	27 (38.1)	54 (83.1)	11 (16.9)
She **was** my friend.	55 (33.5)	109 (66.5)	47 (66.2)	24 (33.8)	60 (92.3)	5 (17.7)
John has a nice suit.	63 (38.4)	109 (61.9)	48 (67.6)	23 (32.4)	58 (89.2)	7 (10.8)
Mary **saw** the officer	52 (31.7)	112 (68.3)	33 (46.4)	38 (53.6)	57 (87.7)	8 (12.3)

reassg.- reassignment *Percentages are written in parenthesis.

Table 4. 13 above presents the frequency and percentage reassignment and non-reassignment of stress in the speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs). Of the 164 LTC, 46.3% reassigned stress in *That was a **great** idea* while the MTC and the HTC correctly reassign stress from *dea,* the usual DTE to *great*, the contrastive DTE, in 77.5% and 86.1% instances respectively. For *He **bought** a black car,* the expected stress reassignment was realised in the speeches of 32.9% of the LTC, 61.9% of the MTC and 83.1% of the HTC. Appropriate stress reassignment in *She **was** my friend* was realised in the rendition of 33.5% of LTC, 66.2% in those of the MTC and 92.3% in the production of HTC. For ***John** has a nice suit*, expected stress reassignment was realised in 38.4% of the LTC, 67.6% of the MTC and 89.2% of the HTC. Only 31.7% of the LTC contrasted meaning by stressing *saw* in *Mary **saw** the officer*. The meaning was expectedly contrasted by 46.4% of the MTC and 87.7% of the HTC. Percentage of appropriate stress reassignment in the utterances as produced by UIYTUs is presented graphically in Figure 4.7 below:

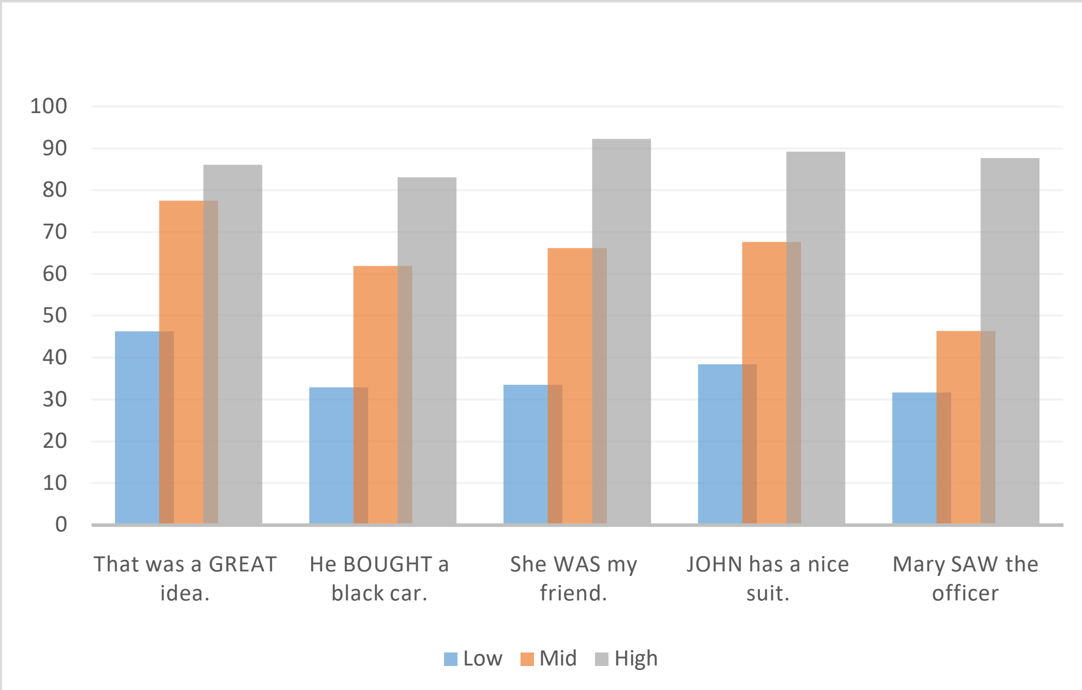


Figure 4.7: Percentage of nuclear stress reassigned by UIYTUs to focused words

Figure 4.7 displays the percentage of nuclear stress reassigned to the contrastive Designated Terminal Element (DTE) of English sentences by UIYTUs. The bars show the approximation strength of each of the groups- high, mid and low- to the native baseline's stressing of focused words for the purpose of contrast. Clearly, the participants with high technology contact had higher percentages for each of the utterances than those with mid technology contact who, in turn, had higher percentages than those with low technology contact.

Table 4.14: Analysis of variance for UIYTUs' contrastive stress assignment

Level of technology contact	N	Mean	Std. deviation		
Low	164	3.63	3.85		
Mid	71	6.41	3.76		
High	65	8.74	2.54		
Total	300	5.39	4.14		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	1311.567	2	655.783	50.93	.000
Within Groups	3824.020	297	12.875		
Total	5135.587	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The result for UIYTUs' reassignment of nuclear stress to focused words for contrastive purposes shows a mean performance of 3.63 for the LTC, 6.41 in the productions of the MTC and a mean stress reassignment of 8.74 for the HTC. Total mean stress reassignment for the 300 participants was 5.39. The difference in the ability of UIYTUs to reassign stress to focused words in order to contrast meanings, based on their technology exposure, is statistically significant [$F_{(2, 297)} = 50.93$; $p < .05$]. By this result, the null hypothesis which states that University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) do not vary significantly in the reassignment of nuclear stress to focused words for contrastive purposes is therefore rejected.

Table 4.15: Multiple (between-group) comparison for UIYTUs' contrastive stress

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Low	Mid	-2.78*	.51	.000	-4.04	-1.53
	High	-5.11*	.53	.000	-6.40	-3.82
Mid	Low	2.78*	.51	.000	1.53	4.04
	High	-2.33*	.62	.001	-3.85	-.82
High	Low	5.11*	.53	.000	3.82	6.40
	Mid	2.33*	.62	.001	.815	3.85

*. The mean difference is significant at the 0.05 level.

Having proved a significant difference in UIYTUs' ability to reassign stress for contrastive purposes, multiple comparison test was performed to establish significant difference(s) between each pair of the groups. The result as displayed in Table 4.15 above confirms that UIYTUs with high technology contact (HTC) significantly reassigned stress to focused words better than UIYTUs with mid technology contact (MD = 2.33; $p < .05$) and UIYTUs with low technology contact (MD = 5.11; $p < .05$). In the same vein, the performance of UIYTUs with mid technology contact was significantly better than that of UIYTUs with low technology contact (MD = 2.78; $p < .05$). Therefore, the established significant differences exist among the three levels of technology contact for nuclear stress reassignment to appropriate syllables of focused words in each of the sentences. Table 4.16 below presents the homogeneous subsets for contrastive stress.

Table 4.16: Homogenous subset- categorisation of UIYTUs for contrastive stress assignment

Scheffe[a,b]

Level of technology contact	N	Subset for alpha = 0.05		
		1	2	3
Low	164	3.63		
Mid	71		6.41	
High	65			8.74
Sig.		1.000	1.000	1.000

Results as displayed in Table 4.16 shows the dissimilarity among UIYTUs with low technology contact (LTC), UIYTUs with mid technology contact (MTC) and UIYTUs with high technology contact (HTC) since there are statistically significant differences among the groups. Participants of the various levels of technology contact therefore belong to different subsets. Figure 4.8 illustrates their performance.

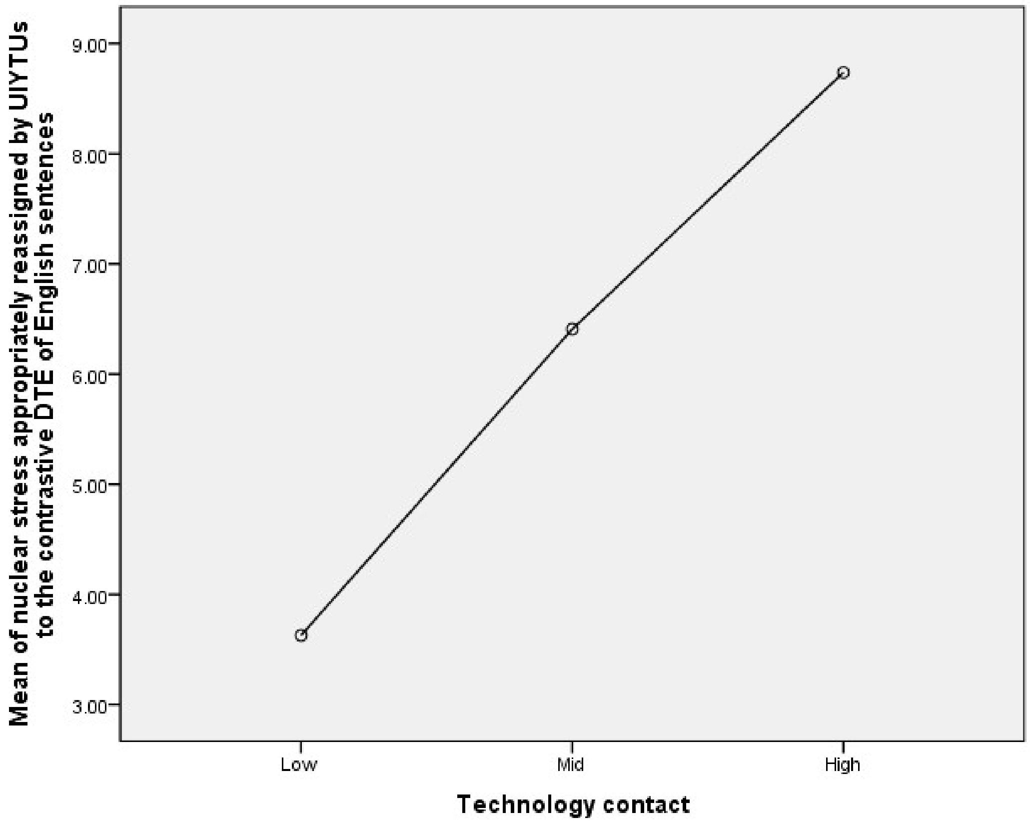


Figure 4.8: Mean of nuclear stress appropriately reassigned by UIYTUs to the contrastive DTE of English sentences

The graph above shows the relationship between the technology contact levels- low, mid and high- and the mean of nuclear stress appropriately reassigned by UIYTUs to the contrastive DTE of English sentences. The points on the graph illustrates the correspondence of the mean value of appropriate contrastive stress realised in the speeches of UIYTU to their technology contact level, implying that the higher the technology exposure, the better UIYTUs were able to contrast meaning in simple sentences using stress.

4.1.5 Statistical analysis of UIYTUs' vowel reduction

Hypothesis five: Vowel reduction in appropriate contexts does not differ significantly in the English speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

The ability of UIYTUs to reduce vowels in unstressed positions was examined under three categories- in the appropriate syllables of content words, grammatical words and words with syllabic consonants as peak. The frequency and percentage reduced vowels in the appropriate syllables of content words are presented in Table 4.17 below:

4.1.5.1 Statistical analysis of vowel reduction in unstressed syllables of content words

Table 4.17: Frequency and percentage of UIYTUs' vowel reduction in the unstressed syllables of content words

		Low		Mid		High	
Words	**Expected Change**	**Vowel Red.**	**Vowel Str.**	**Vowel Red.**	**Vowel Str.**	**Vowel Red.**	**Vowel Str.**
Char**a**cter	/æ→ə/	31 (18.9)	133 (81.1)	39 (54.9)	32 (45.1)	48 (73.8)	17 (26.2)
P**a**rticular	/a:→ə/	40 (24.4)	124 (75.6)	34 (47.9)	37 (52.1)	59 (90.8)	6 (9.2)
Accur**ate**	/eɪ→ə/	50 (30.5)	114 (69.5)	43 (60.6)	28 (39.4)	55 (84.6)	10 (15.4)
T**o**morrow	/ʊ→ə/	62 (37.8)	102 (62.2)	43 (60.6)	28 (39.4)	57 (87.7)	8 (12.3)
Magg**o**t	/ɒ→ə/	33 (20.1)	131 (79.9)	31 (43.7)	40 (56.3)	59 (90.8)	6 (9.2)
P**o**tatoes	/əʊ→ə/	18 (11)	146 (89)	17 (23.9)	54 (76.1)	39 (60)	26 (40)
F**or**get	/ɔ→ə/	57 (34.8)	107 (65.2)	53 (74.6)	18 (25.4)	55 (84.6)	10 (15.4)
Probl**e**m	/e→ə/	34 (20.7)	130 (79.3)	32 (45.1)	39 (54.9)	44 (67.7)	21 (32.3)
P**er**haps	/ɜ:→ə/	37 (22.6)	127 (77.4)	23 (32.4)	48 (67.6)	47 (72.3)	18 (27.7)
S**u**pport	/ʌ→ə/	22 (13.4)	142 (86.6)	27 (62)	44 (38)	48 (73.8)	17 (26.2)

Red.- reduction Str.- strengthening
*Percentages are written in parenthesis.

Table 4.17 shows the lexical entries for vowel reduction in content words as well as the frequency and percentage reduction or erroneous strengthening in the articulation of UIYTUs. Generally, the performance of UIYTUs shows that exposure to technology-based non-enculturation sources of native English is of immense advantage to vowel reduction as the percentages realised increased with progression of technology contact level. Of the 164 LTC, only 18.9% reduced /æ/ in *char**a**cter* to /ə/. The percentage reduction realised for the MTC is 81.1% while 73.8% of the HTC reduced the vowel. The respective percentage reduction of /a:/ in ***par**ticular* to /ə/ for the LTC, the MTC and the HTC participants are 24.4%, 47.9% and 90.8%. For *accur**ate***, 30.5% of the LTC, 60.6% of the MTC and 84.6% of the HTC reduced the vowel appropriately. Only 37.8% of the LTC produced /ə/ in the first syllable of *tomorrow*. The percentage reduction for the MTC and the HTC are 60.6% and 87.7% respectively. The /ɒ/ in *maggot* was reduced to /ə/ by 20.1% of the LTC, 43.7% of the MTC and 90.8% of the HTC. For *potatoes*, 11% of the LTC produced the schwa for the initial syllable while 23.9% of the MTC and 60% of the HTC reduced the vowels appropriately. Of the 164 LTC, 34.8% appropriately reduced the nucleus of the first syllable of *forget* while the MTC and the HTC had 74.6% and 84.6% reduction respectively. The second vowel in *problem* was expectedly reduced by only 20.7% of the LTC, 45.1% of the MTC and 67.7% of the HTC. In *perhaps*, 22.6% of the LTC reduced the vowel of the first syllable while 32.4% and 72.3% appropriate reduction were recorded for the MTC and the HTC respectively. The percentage of appropriate reduction realised for ***su**pport* in the production of the LTC, the MTC and the HTC are 13.4%, 62% and 73.8% respectively. Figure 4.9 graphically illustrates the performance of UIYTUs for vowel reduction in the unstressed syllables of content words.

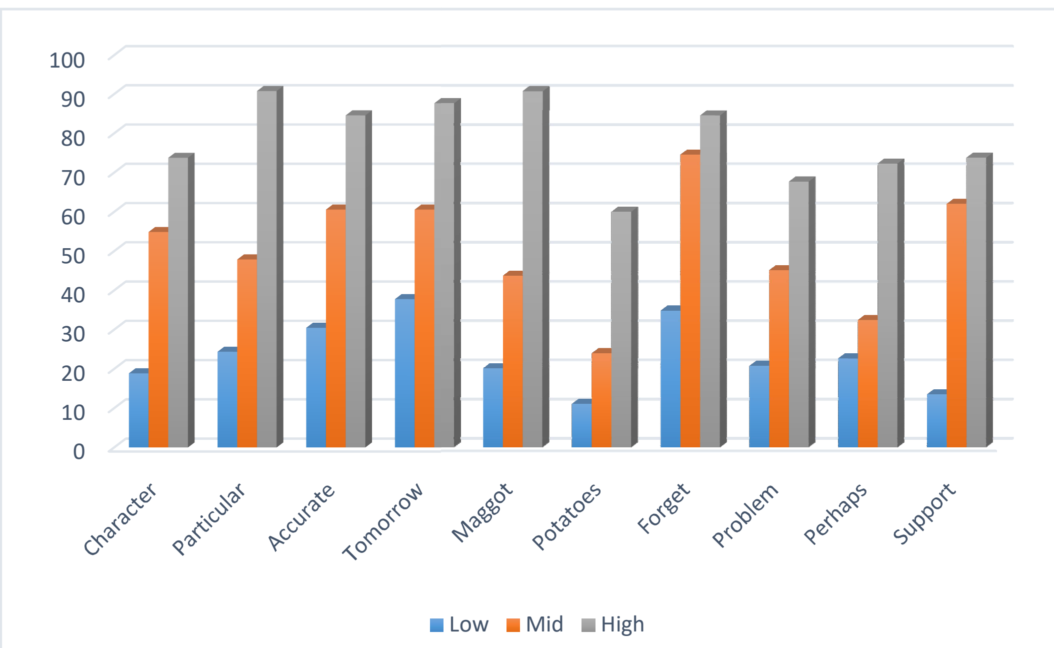


Figure 4.9: Percentage of reduced vowels in the unstressed syllables of content words produced by UIYTUs

Figure 4.9 shows the percentage of reduced vowels in the unstressed syllables of content words produced by UIYTUs. It is revealed from the graph that erroneous strengthening of vowels in unstressed syllables of the content words decreases as technology contact level increases.

Table 4.18: Analysis of variance for UIYTUs' vowel reduction in the unstressed syllables of content words

Level of technology contact	N	Mean	Std. deviation		
Low	164	2.35	2.69		
Mid	71	4.90	2.51		
High	65	7.83	2.85		
Total	300	4.14	3.47		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	1449.901	2	724.950	100.47	.000
Within Groups	2142.936	297	7.215		
Total	3592.837	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.18 shows the result of analysis of variance for UIYTUs' vowel reduction in content words. While there was 2.35 mean vowel reduction in the productions of the LTC, the MTC had a mean reduction of 4.90 and the mean reduction in the speeches of HTC was 7.83. Total mean value realised for all the UIYTUs was 4.14. The result shows that there is statistical significant influence of technology contact on vowel reduction in the unstressed syllable of content words as produced by University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) [$F_{(2, 297)} = 100.47$; $p < .05$].

4.1.5.2 Statistical analysis of vowel reduction in grammatical words

Table 4.19: Frequency and percentage of UIYTUs' vowel reduction in grammatical words

		Low		Mid		High	
Words	**Expected Change**	**Vowel Red.**	**Vowel Str.**	**Vowel Red.**	**Vowel Str.**	**Vowel Red.**	**Vowel Str.**
Was	/ɒ→ə/	83 (50.6)	81 (49.4)	59 (83.1)	12 (16.9)	60 (92.3)	5 (7.7)
Must	/ʌ→ə/	88 (53.7)	76 (46.3)	61 (85.9)	10 (14.1)	63 (96.9)	2 (3.1)
And (potatoes)	/æ→m̩/	50 (30.5)	114 (69.5)	42 (59.2)	29 (40.8)	49 (75.4)	16 (24.6)
And (listen)	/æ→ə/	54 (32.9)	110 (67.1)	44 (62)	27 (38)	46 (70.8)	19 (29.2)
(As) a (present	/eɪ→ə/	78 (47.3)	86 (52.7)	60 (84.5)	11 15.5	63 (96.9)	2 (3.1)
The (concert)	/ɪ:→ə/	36 (22)	128 (78)	30 (42.3)	41 (57.7)	55 (84.6)	10 (15.4)
(Wanted) to	ʊ→ə	55 (33.5)	109 (66.5)	49 (69)	22 (31)	55 (84.6)	10 (15.4)
Of (the week)	/ɑ→ə/	112 (68.3)	52 (31.7)	60 (84.5)	11 (15.5)	61 (93.8)	4 (6.2)
My (pleasure)	/aɪ→ə/	79 (48.2)	85 (51.8)	54 (76.1)	17 (23.9)	59 (86.2)	6 (13.8)
Her (honesty)	/ɜ→ə/	40 (24.4)	124 (75.6)	38 (53.5)	33 (46.5)	48 (73.8)	17 (26.2)

Red.- reduction   Str.- strengthening
*Percentages are written in parenthesis.

Table 4.19 shows the lexical entries for vowel reduction in grammatical words and the frequency and percentage reduction or strengthening in the productions of UIYTUs. Among the LTC, 50.6% reduced /ɒ/ in *was* to /ə/. The respective percentage reduction of /ʌ/ in *must* to /ə/ for the LTC, the MTC and the HTC are 53.7%, 85.9% and 96.9%. *And* was assessed in two contexts- before a bilabial and a lateral sound. In the case of the former, 30.5% of the LTC, 59.2% of the MTC and 75.4% of the HTC reduced the conjunction to /m̩/ as expected. Before a lateral, the expected reduction in *and* was achieved by 32.9% of the LTC, 62% of the MTC and 70.8% of the HTC. The percentage reduction of the article *a* for the LTC, the MTC and the HTC are 47.3%, 60.6% and 87.7% respectively. For the article *the,* usedbefore a consonant, the expected /ɪː→ə/ reduction was realised in 22% of the LTC, 42.3% of the MTC and 84.6% of the HTC. /ʊ/ in *to* was produced as /ə/ by 33.5% of the LTC, 69% of the MTC and 84.6% of the HTC. In o*f,* the appropriate /ɑ→ə/ reduction was produced by 68.3% of the LTC, 84.5% of the MTC and 93.8% of the HTC. For *my (pleasure),* 48.2% of the LTC reduced /aɪ/ in *my* to /ə/ while 76.1% and 86.2% reduction were obtained for the MTC and the HTC respectively. The /ɜ→ə/ reduction in *her* was rendered by 24.4%, 53.5% and 73.8% of the LTC, the MTC and the HTC respectively. Percentage of appropriate vowel reduction in grammatical words as produced by the UIYTUs is presented graphically in Figure 4.10 below:

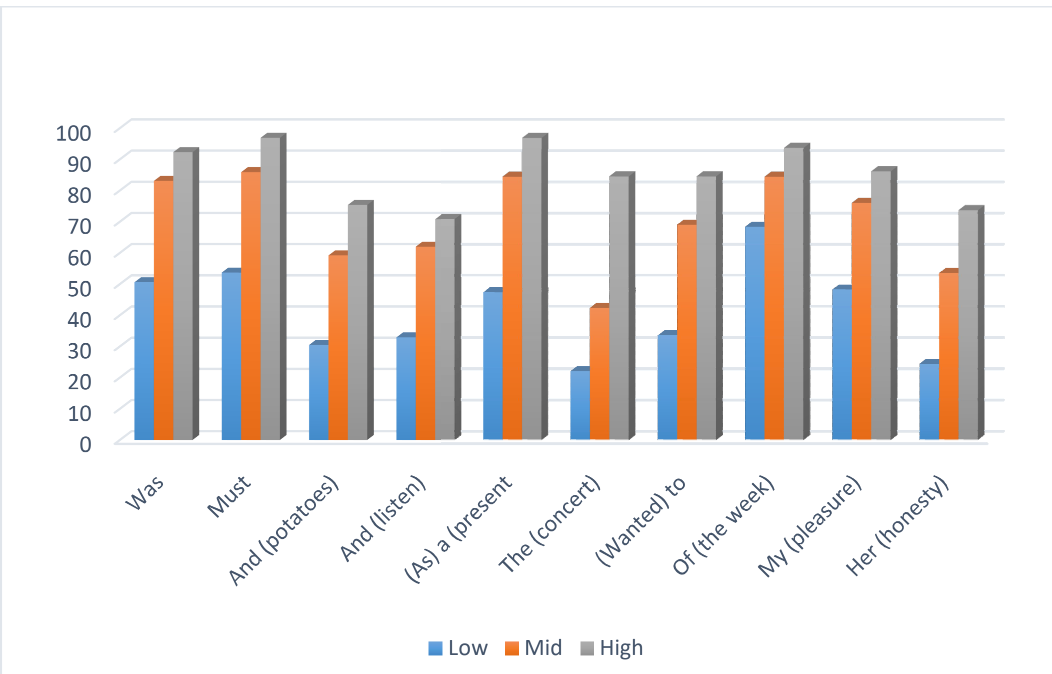


Figure 4.10: Percentage of reduced vowels in grammatical words produced by UIYTUs

A look at the graphical representation of the percentage of reduced vowels realised in the grammatical words produced by UIYTUs, presented in Figure 4.10, testifies to a direct relationship between exposure to technology and ability to reduce vowels of grammatical words in weak positions. The tallest bars (grey) are realised for UIYTUs with high technology contact while the shortest (blue) are realised for UIYTUs with low technology contact.

Table 4.20: Analysis of variance for UIYTUs' vowel reduction in grammatical words

Level of technology contact	N	Mean	Std. deviation		
Low	164	4.03	2.90		
Mid	71	7.00	2.40		
High	65	8.46	2.67		
Total	300	5.69	3.32		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	1072.785	2	536.393	71.47	.000
Within Groups	2229.001	297	7.505		
Total	3301.787	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.20 shows the result of ANOVA to establish significant difference in UIYTUs' vowel reduction in grammatical words. The respective mean reduction in the productions of UIYTUs with low technology contact (LTC), mid technology contact (MTC) and high technology contact (HTC) are 4.03, 7.00 and 8.46. Total mean of all participants' productions is 5.69. Given $F_{(2, 297)} = 71.47$; $p < .05$, the difference in UIYTUs' reduction of vowels in grammatical words, based on their exposure to technology-based non-enculturation sources of contact with native English, is statistically significant.

4.1.5.3 Statistical analysis ofsyllabic consonants as peak of weak syllables

Table 4.21: Frequency and percentage of UIYTUs' production of syllabic consonants as peak of weak syllables

	Low		Mid		High	
Words	**Syllabic Consonant**	**Vowel insertion**	**Syllabic Consonant**	**Vowel insertion**	**Syllabic Consonant**	**Vowel insertion**
Bottle	51 (31.1)	113 (68.9)	37 (52.1)	34 (47.9)	58 (89.2)	7 (10.8)
Couple	30 (18.3)	134 (81.7)	39 (54.9)	32 (45.1)	54 (83.1)	11 (16.9)
Struggle	29 (17.7)	135 (82.3)	24 (33.8)	47 (66.2)	50 (76.9)	15 (23.1)
Threaten	52 (31.7)	112 (68.3)	45 (63.4)	36 (36.6)	55 (84.6)	10 (15.4)
Frighten	83 (50.6)	81 (49.4)	52 (73.2)	19 (26.8)	61 (93.8)	4 (6.2)

*Percentages are written in parenthesis.

The result presented in Table 4.21 above shows the frequency and percentage of UIYTUs' use of syllabic consonants as peak of weak syllables where the vowels are completely elided and the erroneous insertion of vowels /ɪ/ or /ʊ/. Among the participants with low technology contact (LTC), 31.1% produced the expected /l̩/ in the final syllable of *bottle* while52.1% and 89.2% of the MTC and the HTC respectively produced the appropriate form. The */l̩/* in the second syllable of *couple* was produced by 18.3% of the LTC, 54.9% of the MTC and 83.1% of the HTC. While others produced /gʊ/ or /gʊl/ for the latter syllable of *struggle*, 17.7% of the LTC, 33.8% of the MTC and 76.9% of the HTC produced the appropriate */gl̩/*. The */tn̩/* of *threaten* was produced by 31.7% of the LTC, 63.4% of the MTC and 84.6% of the HTC while others inserted /ɪ/ thereby producing /tɪn/. For *frighten*, appropriate syllabic consonant use was realised in the productions of 50.6% of the LTC, 73.2% of the MTC and 93.8% of the HTC. Graphical illustration showing the percentage UIYTUs' appropriate use of syllabic consonants as peak of weak syllables is presented in Figure 4.11 below.

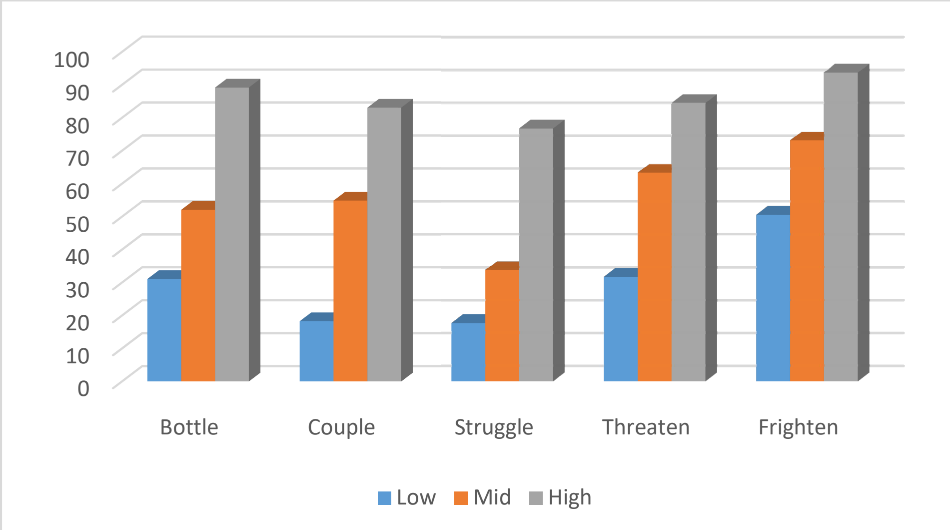


Figure 4.11: Percentage of syllabic consonants produced as peak of weak syllables by UIYTUs

The peak of theunstressed syllables of *bottle, couple, struggle, threaten* and *frighten*, are completely elided and replaced by syllabic consonants. Figure 4.11 which graphically presents the percentage of syllabic consonants produced as peak of weak syllables by UIYTUs shows that UIYTUs with high technology contact used syllabic consonants as peak of weak syllables better than UIYTUs with mid technology contact and UIYTUs with mid technology contact used syllabic consonants as peak of weak syllables better than UIYTUs with low technology contact.

Table 4.22: Analysis of variance for UIYTUs' use of syllabic consonants as peak of weak syllables

Level of technology contact	N	Mean	Std. deviation		
Low	164	1.43	1.69		
Mid	71	2.96	1.75		
High	65	4.42	1.72		
Total	300	2.44	2.09		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	439.000	2	219.500	75.03	.000
Within Groups	868.920	297	2.926		

Total	1307.920	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The result for UIYTUs' use of syllabic consonants as peak of weak syllables presented in Table 4.22 above shows a mean performance of 1.43 for the LTC, 2.94 in the productions of the MTC and a mean appropriate syllabic consonant use of 4.42 for the HTC. Total mean production was 2.44. The influence of technology-based non-enculturation sources to which UIYTUs are exposed on their ability to use syllabic consonants as peak of weak syllables is statistically significant [$F_{(2, 297)} = 75.03$; $p < .05$].

Table 4.23: Analysis of variance for UIYTUs' overall performance in vowel reduction

Level of technology contact	**N**	**Mean**	**Std. deviation**		
Low	164	7.95	6.42		
Mid	71	14.87	5.60		
High	65	20.51	6.51		
Total	300	12.31	8.09		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	7959.175	2	3979.588	101.71	.000
Within Groups	11620.611	297	39.127		
Total	19579.787	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.23 shows the result of one-way analysis of variance (ANOVA) for the overall performance of UIYTUs in vowel reduction. While there was 7.95 mean vowel reduction in the productions of participants with low technology contact (LTC), the MTC had a mean reduction of 14.87 and the mean reduction in the speeches of the HTC was 20.51. Total mean value obtained for the of the 300 research participants was 12.31. The result shows that the influence of technology contact on vowel reduction is statistically significant [$F_{(2, 297)} = 101.71$; $p < .05$]. Based on this result, the null hypothesis which states that vowel reduction in appropriate contexts does not differ significantly in the English speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) is rejected. Multiple comparison test was performed to identify where the difference(s) is/are among the LTC, the MTC, and the HTC. The result is presented in Table 4.23

Table 4.24: Multiple (between-group) comparison for UIYTUs' vowel reduction

Dependent variable	(I) Technology contact	(J) Technology Contact	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
						Lower bound	Upper bound
Vowel reduction (content words)	Low	Mid	-2.55*	.38	.000	-3.49	-1.61
		High	-5.48*	.39	.000	-6.45	-4.51
	Mid	Low	2.55*	.38	.000	1.61	3.49
		High	-2.93*	.46	.000	-4.06	-1.80
	High	Low	5.48*	.39	.000	4.51	6.45
		Mid	2.93*	.46	.000	1.80	4.06
Vowel reduction (grammatical words)	Low	Mid	-2.97*	.39	.000	-3.93	-2.01
		High	-4.43*	.40	.000	-5.42	-3.44
	Mid	Low	2.97*	.39	.000	2.01	3.93
		High	-1.46*	.47	.009	-2.62	-.31
	High	Low	4.43*	.40	.000	3.44	5.42
		Mid	1.46*	.47	.009	.305	2.67
Syllabic consonant as peak	Low	Mid	-1.51*	.24	.000	-2.11	-.92
		High	-2.98*	.25	.000	-3.60	-2.37
	Mid	Low	1.51*	.24	.000	.92	2.11
		High	-1.47*	.29	.000	-2.19	-.75
	High	Low	2.98*	.25	.000	2.37	3.60
		Mid	1.47*	.29	.000	.75	2.19

* The mean difference is significant at the 0.05 level.

Table 4.24 shows that vowel reduction in the speeches of UIYTUs exhibit statistically significant differences in the appropriate syllables of content words, grammatical words and use of syllabic consonant as peak of weak syllables. The differences are also established among the three levels of technology contact. The HTC reduced significantly more vowels in content words than the MTC (MD = 2.93; p <.05) who, in turn, performed significantly better than the LTC (MD = 2.55; p <.05). Mean difference between the HTC and the MTC for grammatical words is significant (MD = 1.46; p <.05). Also, given MD = 2.97; p <.05 between the MTC and the LTC mean difference is significant. The UIYTU' production of words with syllabic consonants as peak of weak syllables reveals statistically significant differences between the HTC and the MTC (MD = 1.47; p <.05) and between the MTC and the LTC (MD = 1.51; p <.05). Figure 4.12 below shows the graphical representation of UIYTUs' overall performance in vowel reduction.

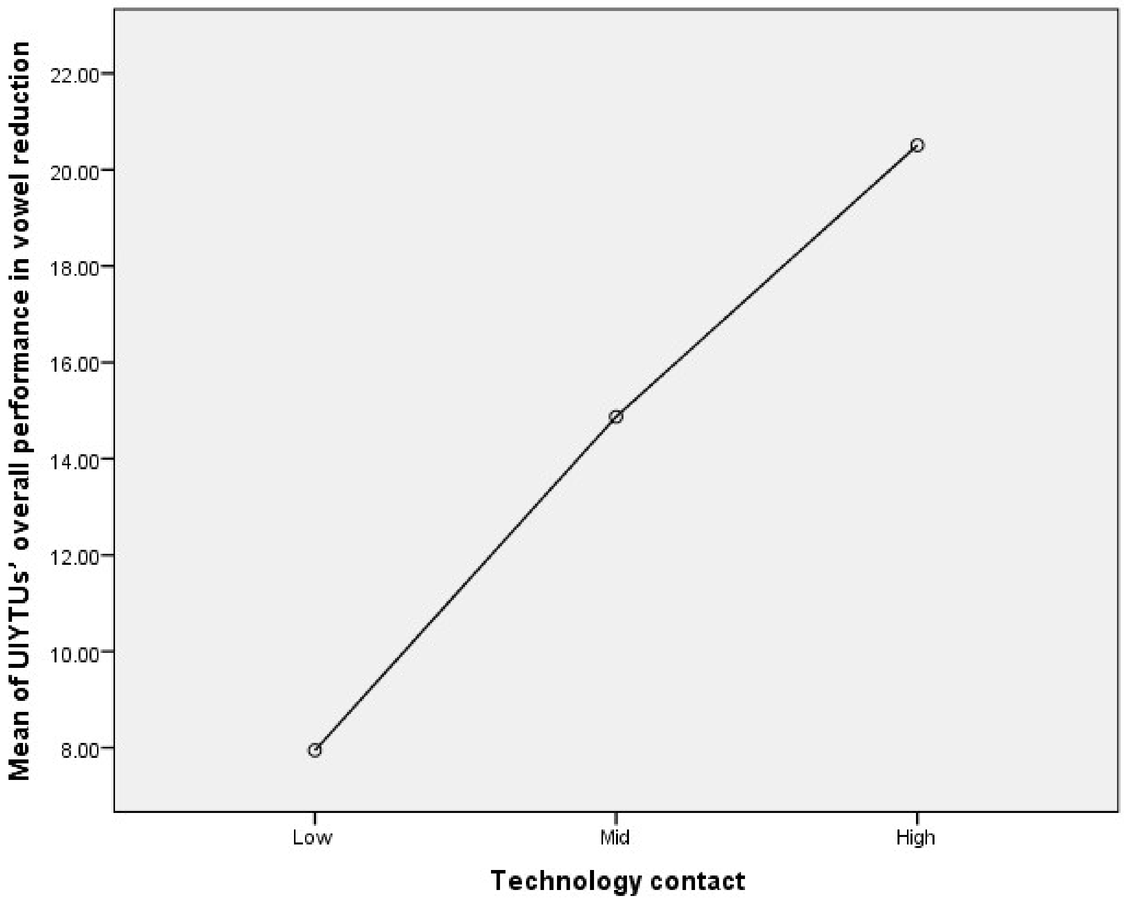


Figure 4.12: Mean of UIYTUs' overall performance in vowel reduction

The graph in Figure 4.12 shows a clear upward trend for UIYTUs' overall performance in vowel reduction as the level of technology contact increases. This implies the technological facilities through which they access native English positively influence their ability to reduce vowels in appropriate contexts.

4.1.6 Statistical analysis of UIYTUs' stress shift

Hypothesis six: There is no significant difference in contextual stress shift in the English speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC).

To test the above hypothesis, UIYTUs' ability to shift stress was examined in words with stress-shifting suffixes, variable words and phrases with iambic feet followed by stressed syllables. For each of the categories, the frequency and percentage of appropriate and inappropriate rendition of UIYTUs are first presented followed by analysis of variance of the three levels of technology contact. Their performances are also graphically illustrated.

4.1.6.1 Statistical analysis of suffixation-driven stress shift

Table 4.25: Frequency and percentage of UIYTUs' stress shift in words with stress shifting suffixes

	Low		**Mid**		**High**	
Words	**Stress shift**	**Non-shift**	**Stress shift**	**Non-shift**	**Stress shift**	**Non-shift**
ˈClimate→cliˈmatic	59 (36)	105 (64)	57 (80.3)	14 (19.7)	60 (92.3)	5 (7.7)
ˈPhoto→phoˈtography	9 (5.5)	158 (94.5)	9 (12.7)	62 (87.3)	43 (66.2)	22 (33.8)
ˈPerfect→perˈfection	40 (24.4)	124 (75.6)	36 (50.7)	35 (49.3)	57 (87.7)	8 (12.3)
ˈProverb→proˈverbial	61 (37.2)	103 (62.8)	53 (74.6)	18 (25.4)	59 (90.8)	6 (9.2)
ˈTranquil→tranˈquility	90 (54.9)	74 (45.1)	59 (83.1)	12 (16.9)	61 (93.8)	4 (6.2)

*Percentages are written in parenthesis.

Table 4.25 presents the frequency and percentage of UIYTUs' ability to shift stress resulting from suffixation. For *ˈclimate→cliˈmatic,* the shift of stress from *cli-* in *climate* to *-ma-* in *climatic* was realised in the productions of 36% of the LTC, 80.3% of the MTC and 92.3% of the HTC. The native baseline's shift of stress from *pho-* to *-to-* in *ˈphoto→phoˈtography* was produced by 5.5% of the LTC. 12.7% of the MTC and 66.2% of the HTC. Of the 164 LTC only 24.4% shifted stress from *per-* to *-fec-* in *ˈperfect→perˈfection.* There were 50.7% and 87.7%

appropriate stress shift for the MTC and the HTC respectively. The 1st→2nd syllable stress shift perceived in the native baseline's production of *ˈproverb→proˈverbial* was realised in the production of 37.2% of the LTC, 74.6% of the MTC and 90.8% of the HTC. Expected stress shift from *tran-* to *-qui* in *ˈtranquil→tranˈquility*was produced by 54.9% of the LTC, 83.1% of the participants with mid technology contact and 93.8% of the HTC.Percentage of appropriate stress shift resulting from suffixation as produced by UIYTUs is presented graphically in Figure 4.13 below:

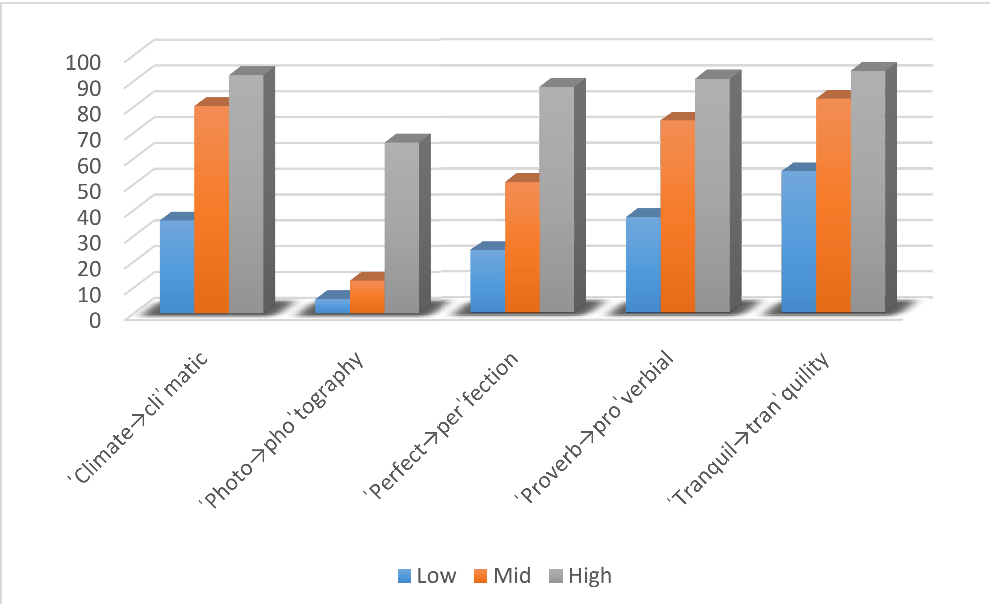


Figure 4.13: Percentage of appropriate stress shift resulting from suffixation realised in the production of UIYTUs

The bar graph in Figure 4.13 shows the percentage of appropriate stress shift resulting from suffixation realised in the production of UIYTUs. Apparently, more cases of stress shift were realised in the speeches the participants with high technology contact, represented by the grey bars than were found in the productions of UIYTUs with mid technology contact (blue bars). Also, the percentages of stress shift realised in the productions of UIYTUs with mid technology contact for each of the lexical items were higher than those of UIYTUs with low technology contact.

Table 4.26: Analysis of variance for UIYTU' stress shift in words with stress-shifting suffixes

Level of technology contact	N	Mean	Std. deviation		
Low	164	3.11	3.02		
Mid	71	5.97	2.74		
High	65	8.65	2.53		
Total	300	4.99	3.63		
	Sum of Squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	1517.117	2	758.559	93.30	.000
Within Groups	2414.830	297	8.131		
Total	3931.947	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.26 shows the result of ANOVA of University of Ibadan Yoruba Teenage Undergraduates with low, mid and high technology contact for stress shift in words with stress-shifting suffixes. While there was 3.11 mean appropriate stress shift in the productions of the LTC, the MTC had a mean appropriate stress shift of 5.97 and the mean stress shift realised in the speeches of HTC was 8.65. Total mean of the 300 research participants was 4.99. The result shows that there is statistical significant difference in stress shift resulting from suffixation in the speeches of University of Ibadan Yoruba Teenage Undergraduates with high, mid and low technology contact [$F_{(2, 297)} = 93.30$; $p < .05$].

4.1.6.2 Statistical analysis of stress shift in variable words

Table 4.27: Frequency and percentage of UIYTUs' stress shift in variable words

	Low		Mid		High	
Words	**Stress shift**	**Non-shift**	**Stress shift**	**Non-shift**	**Stress shift**	**Non-shift**
ˈConduct/ Conˈduct	27 (16.5)	137 (83.5)	34 (47.9)	37 (52.1)	50 (76.9)	15 (23.1)
ˈPresent/ Preˈsent	130 (79.3)	34 (20.7)	63 (88.7)	8 (11.3)	63 (96.9)	2 (3.1)
ˈSuspect/ Susˈpect	66 (40.2)	98 (59.8)	50 (70.4)	21 (29.6)	53 (81.5)	12 (18.5)
ˈObject/ Obˈject	101 (61.6)	63 (38.4)	61 (85.9)	10 (14.1)	60 (92.3)	5 (7.7)
ˈProduce/ proˈduce	136 (82.9)	28 (17.1)	71 (100)	0 (0)	63 (96.9)	2 (3.1)

*Percentages are written in parenthesis.

In this section, UIYTUs' ability to shift stress in words that can function both as nouns and verbs were assessed. Tokens and percentages of their appropriate shift of stress in variable words is presented in Table 4.26. The primary stress was shifted appropriately in *ˈconduct/conˈduct* by 16.5% of the LTC, 47.9% of the MTC and 76.9% of the HTC. The shift in *ˈpresent/ preˈsent* was perceived in the production of 79.3% of the LTC, 88.7% of the MTC and 96.9% of the HTC. The percentage of UIYTUs who shifted stress in *ˈsuspect/ susˈpect* are 40.2%, 70.4% and 81.5% of the LTC, the MTC and the HTC respectively. Among the LTC, 61.6% shifted stress appropriately in *ˈobject/ obˈject.* There were 85.9% and 92.3% appropriate stress shift perceived from the productions of the MTC and the HTC respectively. The expected stress shift in *ˈproduce/ proˈduce* was realised in the rendition of 82.9% of the LTC, all participants of the MTC and 96.9% of the HTC. Below is a graphical illustration of the percentage of appropriate stress shift in variable words as produced by UIYTUs.

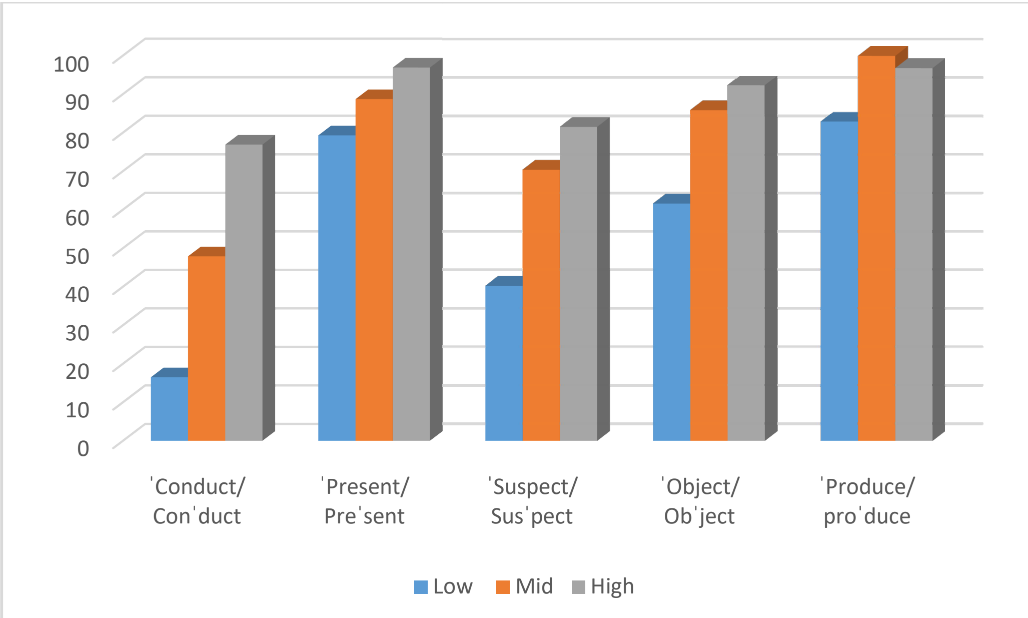


Figure 4.14: Percentage of stress shift realised in UIYTUs' production of variable words

The bar chart in Figure 4.14 shows that higher percentages of stress shift were realised in UIYTUs' production of variable words as the technology contact level progressed.

Table 4.28: Analysis of variance for UIYTUs' stress shift in variable words (noun/verb shift)

Level of technology contact	**N**	**Mean**	**Std. deviation**		
Low	164	5.57	2.69		
Mid	71	7.86	2.15		
High	65	8.89	2.12		
Total	300	6.83	2.84		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	610.707	2	305.354	50.58	.000
Within Groups	1792.960	297	6.037		
Total	2403.667	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The result of analysis of variance for UIYTUs' stress shift in variable words which can function both as nouns and verbs is displayed in Table 4.28. The result shows 2.35 mean variable word stress shift in the productions of University of Ibadan Yoruba Teenage Undergraduates with low technology contact (LTC). UIYTUs with mid technology contact (MTC) had a mean stress shift of 7.86 and the mean stress shift in the speeches of those with high technology contact (HTC) was 8.89. Mean performance of the 300 research participants was 6.83. The result shows that the difference in variable word stress shift among University of Ibadan Yoruba Teenage Undergraduates with varying degrees of technology exposure is statistically significant [$F_{(2, 297)} = 50.58; p < .05$].

4.1.6.3 Statistical analysis of stress shift for iambic feet reversal

Table 4.29: Frequency and percentage of UIYTUs' stress shift for iambic feet reversal

	Low		**Mid**		**High**	
Words	**Stress shift**	**Non-shift**	**Stress shift**	**Non-shift**	**Stress shift**	**Non-shift**
Thirˈteen/ ˈThirteen (yesterday)	9 (5.5)	155 (94.5)	7 (9.9)	64 (89.1)	36 (55.3)	29 (44.7)
Eighˈteen/ ˈEighteen (seats)	12 (7.3)	152 (92.7)	8 (11.2)	63 (88.8)	34 (52.3)	31 (47.7)

*Percentages are written in parenthesis.

Table 4.29 shows the frequency and percentage of UIYTUs' stress shift for words with iambic feet followed by stressed syllables requiring leftward shift of stress to avoid stress clashes. Two teen words- *thirteen* and *eighteen*- were examined in the participants' production. In their rendition of *thirteen (yesterday)*, the expected stress shift from *-teen* to *thir-* in order to space out stress between *-teen* and *yes-* was realised in only 5.5% of the LTC, 9.9% of the MTC and 55.3% of the HTC. Only 7.3% of the LTC shifted stress from *-teen* to *eigh-* in *eighteen (seats)* to avoid a clash between *-teen* and *seats.* The appropriate shift realised in the speeches of the MTC and the HTC are 11.2% and 52.3% respectively. Figure 4.15 is a graphical illustration of UIYTUs' percentage of stress shift where iambic feet reversal is required.

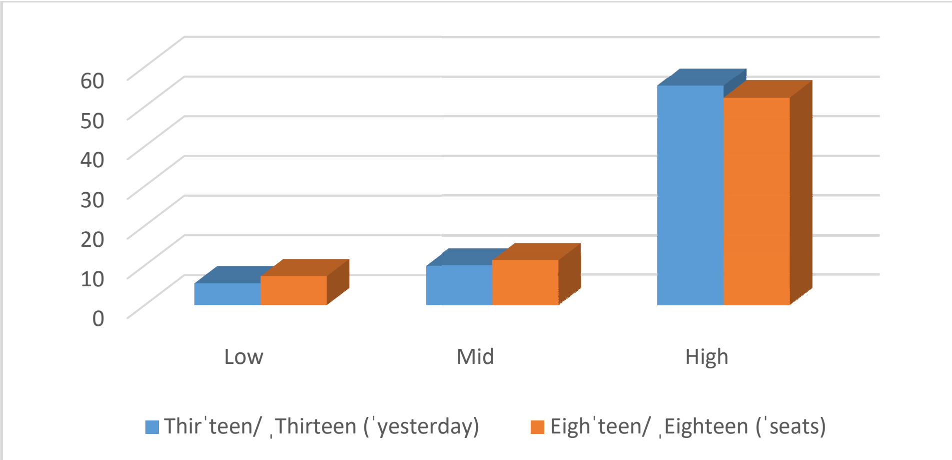


Figure 4.15: Percentage of stress shift realised in UIYTUs' rendition of phrases where iambic feet reversal is required to avoid stress clash

The percentage of stress shift realised in UIYTUs' rendition of phrases where iambic feet reversal is required to avoid stress clash is presented in Figure 4.15. The blue bars show the percentage approximation realised for *thirˈteen/ ˈthirteen (yesterday)* in the speeches of UIYTUs while the orange bars represent their percentage approximation realised for r*eighˈteen/ ˈeighteen (seats)*. The distinctly tall bars of the high category show that they approximated evidently better than the other groups. The bars of the mid category show that they did not perform much better that their low counterparts.

Table 4.30: Analysis of variance for UIYTUs' stress shift for iambic feet reversal

Level of technology contact	**N**	**Mean**	**Std. deviation**
Low	164	.32	1.08
Mid	71	.53	1.33
High	65	2.54	2.23
Total	300	.85	1.71

	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	239.047	2	119.523	56.17	.000
Within Groups	632.043	297	2.128		
Total	871.090	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.30 shows the result of ANOVA to establish significant differences among UIYTUs with high technology contact, mid technology contact and low technology contact in stress shift necessary to space out stress in two utterances. The mean stress clash avoidance in the speeches of UIYTUs with low technology contact was 0.32. UIYTUs with mid technology contact had mean stress shift of 0.53 while UIYTUs with high technology contact had a mean of 2.54 stress shift. Mean performance for all the participants was 0.85. The result shows that there is statistical significant difference in the performance of UIYTUs with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) [$F_{(2, 297)} = 56.17$; $p < .05$].

Table 4.31: Analysis of variance for UIYTUs' overall performance in stress shift

Level of technology contact	**N**	**Mean**	**Std. deviation**		
Low	164	10.04	16.18		
Mid	71	14.09	4.87		
High	65	20.11	5.54		
Total	300	13.18	13.07		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	4795.887	2	2397.943	15.39	.000
Within Groups	46289.393	297	155.857		
Total	51085.280	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The result of analysis of variance (ANOVA) for the overall performance in stress shift realised in the articulation of University of Ibadan Yoruba Teenage Undergraduates with low, mid and high technology contact presented in Table 4.31 shows that there was 10.04 mean stress shift in the productions of the LTC. The MTC had a mean stress shift of 14.09 and the mean stress shift for the HTC was 20.11. Total mean for the 300 participants was 12.31. The result shows that the difference in the performance of University of Ibadan Yoruba Teenage Undergraduates' shift of stress on English words and utterances is statistically significant [$F_{(2, 297)} = 15.39$; $p < .05$]. Based on this result, the null hypothesis which states that there is no significant difference in stress shift in the English speeches of University of Ibadan Yoruba Teenage Undergraduates UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) is rejected.

Table 4.32: Multiple (between-group) comparison for UIYTUs' stress shift

Dependent variable	(I) Technology contact	(J) Technology Contact	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
						Lower bound	Upper bound
Stress shift (suffixation)	Low	Mid	-2.86*	.41	.000	-3.86	-1.87
		High	-5.54*	.42	.000	-6.57	-4.51
	Mid	Low	2.86*	.41	.000	1.87	3.86
		High	-2.67*	.49	.000	-3.88	-1.47
	High	Low	5.54*	.42	.000	4.51	6.57
		Mid	2.67*	.49	.000	1.47	3.88
Stress shift (variable words)	Low	Mid	-2.29*	.35	.000	-3.15	-1.43
		High	-3.32*	.36	.000	-4.21	-2.43
	Mid	Low	2.29*	.35	.000	1.43	3.15
		High	-1.03	.42	.051	-2.07	.01
	High	Low	3.32*	.36	.000	2.43	4.21
		Mid	1.03	.42	.051	-.01	2.07
Stress shift (Iambic reversal)	Low	Mid	-.21	.21	.605	-.72	.30
		High	-2.22*	.21	.000	-2.75	-1.69
	Mid	Low	.21	.21	.605	-.30	.72
		High	-2.01*	.25	.000	-2.63	-1.40
	High	Low	2.22*	.21	.000	1.69	2.75
		Mid	2.01*	.25	.000	1.40	2.63

* The mean difference is significant at the 0.05 level.

Table 4.32 shows the result of multiple comparison which determines significant differences between each pair of the technology contact levels for stress shift. The UIYTUs' ability to shift stress in words with stress-shifting suffixes reveals significant differences among the three levels of technology contact as the HTC performed significantly better than the MTC

(MD = 2.67; p <.05) and the LTC (MD = 5.54; p <.05). Also, the MTC performed significantly better than the LTC (MD =2.86; p <.05). Stress shift in variable words exhibited statistical significant differences only between the HTC and the LTC (MD = 3.32; p <.05) and between the MTC and the LTC (MD = 2.29; p <.05). Although the HTC performed better than the MTC, the mean difference is not statistically significant (MD = 1.03; p <.05). There was significant difference between the mean performance of the HTC and the MTC (MD = 2.01; p <.05) and between the HTC and the LTC (MD = 2.22; p <.05) for iambic feet reversal. On the contrary, the mean difference between the MTC and the LTC is not statistically significant (MD = .21; p <.05). The former however performed better than the latter.

Table 4.33: Homogenous subset- categorisation of UIYTUs for stress shift

Scheffe[a,b]

Level of technology contact	**N**	**Subset for alpha = 0.05**	
		1	**2**
Low	164	10.04	
Mid	71	14.09	
High	65		20.11
Sig.		.110	1.000

Means for groups in homogeneous subsets are displayed in Table 4.34. The result shows that University of Ibadan Yoruba Teenage Undergraduates with low technology contact (LTC) were similar to UIYTUs with mid technology contact (MTC) as the difference in their performance for stress shift is not statistically significant. The MTC and the LTC participants therefore belong to the same subset. Since the difference between UIYTUs with high technology contact (HTC) and the other two groups is statistically significant, participants with high technology contact belong to a different subset. Figure 4.16 below illustrates their mean performance.

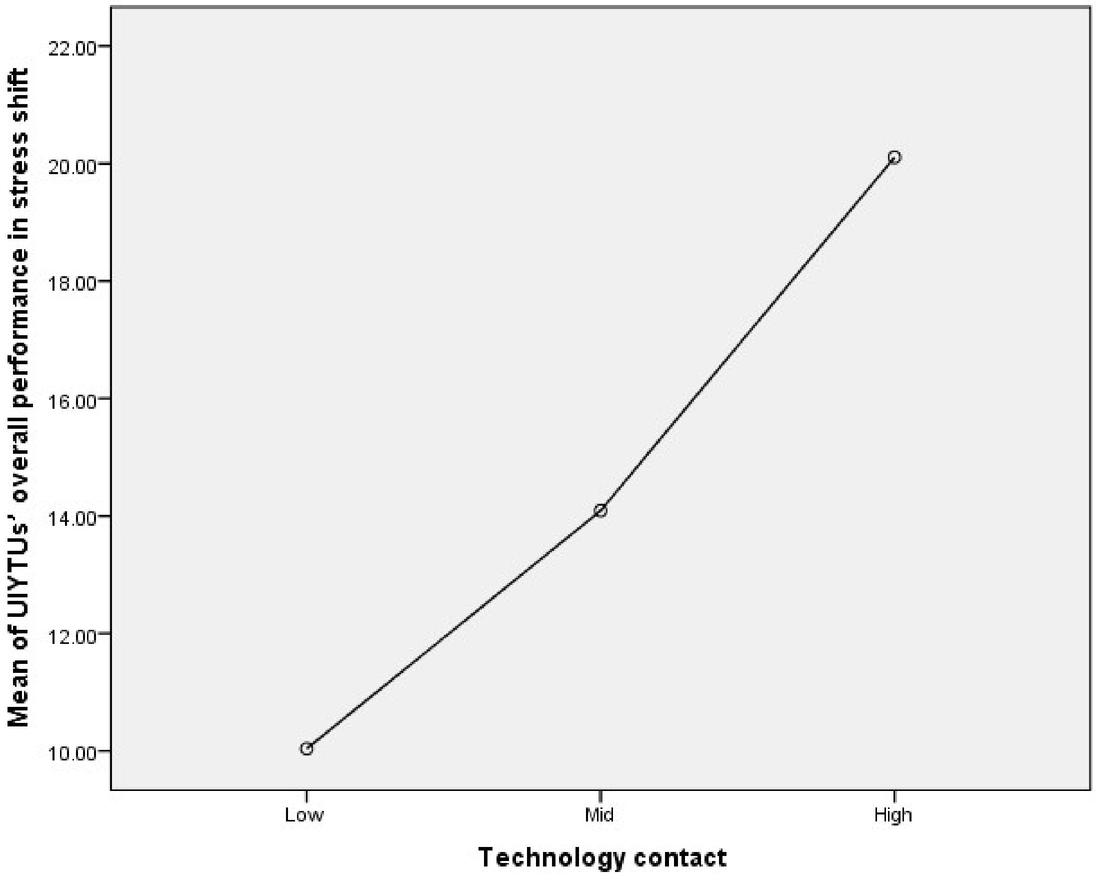


Figure 4.16: Mean of UIYTUs' overall performance in stress shift

The graph above shows the mean of UIYTUs' overall performance in stress shift. Generally, each of the groups performed better than the next lower group and vice versa. The difference between the mean for the high technology contact and the mean for the mid technology contact is, however, shown in the graph to be more significant than the mean difference between the mid technology contact and the low technology contact.

4.1.7 Statistical analysis of UIYTUs' elision of appropriate segments

Hypothesis seven: Segmental elision in the speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) does not vary significantly based on their exposure to and use of technology-based non-enculturation sources of contact with Standard English.

Table 4.34: Frequency and percentage of UIYTUs' performance in segmental elision

	Low		Mid		High	
Words	**Elision**	**Retention**	**Elision**	**Retention**	**Elision**	**Retention**
Secret**a**ry	156 (95.1)	8 (4.9)	71 (100)	0	64 (98.5)	1 (1.5)
Strawb**e**rries	57 (34.7)	107 (65.3)	45 (63.4)	26 (36.6)	57 (87.7)	8 (12.3)
Cars**o**n	83 (50.6)	81 (49.4)	52 (73.2)	19 (26.8)	61 (93.8)	4 (6.2)
Lis**t**en	127 (77.4)	37 (22.6)	65 (91.5)	6 (8.5)	63 (96.9)	2 (3.1)
Wres**t**le	133 (81.1)	31 (18.9)	68 (96.7)	3 (3.3)	62 (95.4)	3 (4.6)

*Percentages are written in parenthesis.

Table 4.34 shows the frequency and percentage of segmental elision perceived in the speeches of UIYTUs. The /æ/ elided in *secretary* by the native baseline was appropriately elided by 95.1% of the LTC, all the participants in the mid category and 98.5% of the HTC. /e/ in *strawberries* was elided by 43.7% of the LTC, 63.4% of the MTC and 87.7% of the HTC. While others produced /ka:sɪn/ or /ka:sɒn/, the nucleus of the second syllable of *Carson* was elided by 50.6%, 73.2% and 93.8% of the LTC, the MTC and the HTC respectively. The/t/ in *listen* was appropriately elided by 77.4% of the LTC, 91.5% of the MTC and 96.9% of the HTC. Also, the /t/ in *wrestle* was elided by 81.1% of the LTC, 96.7% of the MTC and 95.4% of the HTC, while the others yielded to spelling-cued mispronunciation by retaining the segment in both words. The percentage of appropriate elision done by the UIYTUs is graphically presented in Figure 4.17.

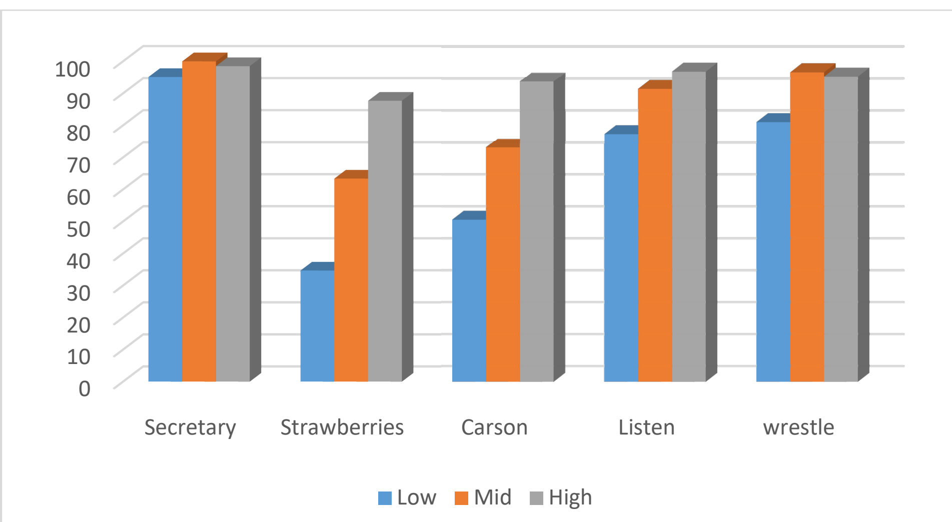


Figure 4.17: Percentage of UIYTUs' elision of appropriate segments

The percentages of UIYTUs' elision of the bolded segments in *secret**a**ry, strawb**e**rries, Cars**o**n, lis**t**en* and *wres**t**le* are presented in Figure 4.17. Generally, the graph shows the participants' high level of awareness of the phenomenon, particularly in *secretary, listen* and *wrestle*. The bars display higher percentages for UIYTUs with high technology contact in the elision of appropriate segments in *strawb**e**rries, Cars**o**n,* and *lis**t**en*than for UIYTUs with mid technology contact. Higher percentages are displayed for the latter in *secretary* and *wrestle.* Both groups perform better than UIYTUs with low technology contact in all the instances.

Table 4.35: Analysis of variance for UIYTUs' elision of appropriate segments

Level of technology contact	N	Mean	Std. deviation
Low	164	6.71	2.47
Mid	71	8.27	1.72
High	65	9.37	1.80
Total	300	7.65	2.44

	Sum of squares	Df	Mean square	F	Sig.
Between Groups	364.941	2	182.471	38.41	.000
Within Groups	1411.005	297	4.751		
Total	1775.947	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The result of analysis of variance (ANOVA) for segmental elision in the speeches of UIYTUs with low technology contact (LTC), mid technology contact (MTC) and high technology contact (HTC) is displayed in Table 4.35. While there was 6.71 mean appropriate segmental elision in the productions of the LTC, the MTC had a mean appropriate elision of 8.27 and the mean elision in the speeches of the HTC was 9.37. Total mean elision for the 300 research participants was 7.65. The result shows that the difference in UIYTUs' ability to elide segments appropriately is statistically significant based on their exposure to technology-based non-enculturation sources [$F_{(2, 297)} = 38.41$; $p < .05$]. By this result, the null hypothesis which states that segmental elision in the speeches of University of Ibadan Yoruba Teenage

Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) does not vary significantly, based on their exposure to and use of technology-based non-enculturation sources of contact with Standard English, is rejected.

Table 4.36: Multiple (between-group) for UIYTUs' segmental elision

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Low	Mid	-1.56*	.31	.000	-2.32	-.80
	High	-2.66*	.32	.000	-3.45	-1.88
Mid	Low	1.56*	.31	.000	.80	2.32
	High	-1.10*	.37	.014	-2.02	-.18
High	Low	2.66*	.32	.000	1.88	3.45
	Mid	1.10*	.37	.014	.18	2.02

*. The mean difference is significant at the 0.05 level.

Result of the multiple comparison test to determine significant differences between each pair of the categories of UIYTUs for segmental elision is presented in Table 4.36. The result reveals that there is a significant mean difference between UIYTUs with high technology contact and UIYTUs with mid technology contact (MD= 1.10; $p < .05$) and between UIYTUs with high technology contact and UIYTUs with low technology contact (MD = 2.66; $p < .05$). Mean difference between UIYTUs with mid technology contact and UIYTUs with low technology contact is also statistically significant (MD = 1.56; $p < .05$). Therefore, the established significant differences exist among the three levels of technology contact. Homogeneous subsets in Table 4.36 shows the categories to which UIYTUs belong.

Table 4.37: Homogenous subset: categorisation of UIYTUs for segmental elision

Scheffe[a,b]

Level of technology contact	N	Subset for alpha = 0.05		
		1	2	3
Low	164	6.71		
Mid	71		8.27	
High	65			9.37

Sig.	1.000	1.000	1.000

Means for groups in homogeneous subsets displayed in Table 4.37 reveals that University of Ibadan Yoruba Teenage Undergraduates with low technology contact were dissimilar to UIYTUs with mid technology contact who were, in turn, different from UIYTUs with high technology contact. The three groups therefore belong to different subsets based on their performance in segmental elision. The participants' performance is illustrated in Figure 4.18 below:

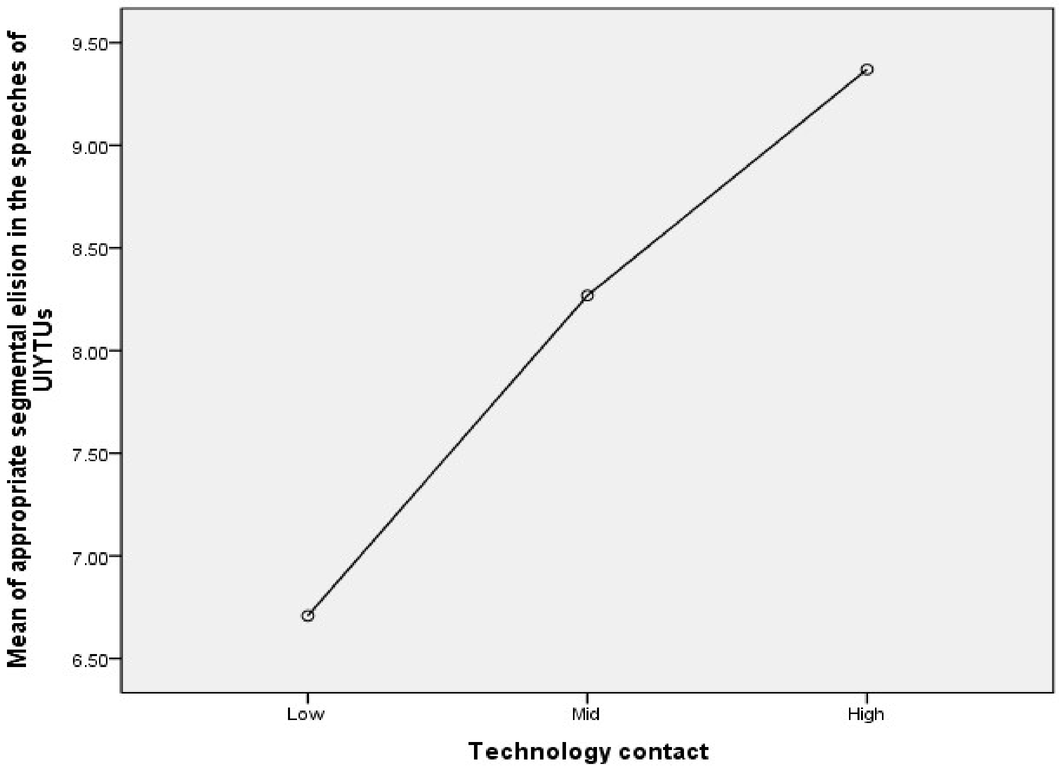


Figure 4.18: Mean of appropriate segmental elision in the speeches of UIYTUs

The graph above shows the mean of appropriate segmental elision in the speeches of UIYTUs in relation to their technology contact levels. The upward trend of the graph shows that appropriate segmental elision in the rendition of UIYTUs gets better as their exposure to technological facilities which make native English accessible gets higher.

4.1.8 Statistical analysis of UIYTUs' stressed and unstressed syllable alternation

Hypothesis eight: Alternation of stressed and unstressed syllables in the speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) does not significantly differ.

Table 4.38: Frequency and Percentage of UIYTUs' Strong/Weak Syllable Alternation

	Low		**Mid**		**High**	
Utterance	**Alternation**	**Clash**	**Alternation**	**Clash**	**Alternation**	**Clash**
Congratulations (WSWSW)	129 (78.7)	35 (21.3)	67 (94.4)	4 (5.6)	62 (95.4)	3 (4.6)
A printout (WSW)	8 (4.9)	156 (95.1)	11 (15.5)	60 (84.5)	33 (50.8)	32 (49.2)
A black bird (WWS)	9 (5.5)	155 (94.5)	11 (15.5)	60 (84.5)	30 (56.2)	35 (53.8)
Ask them to come to the party (SWWSWWSW).	54 (32.9)	110 (67.1)	44 (62)	27 (38)	58 (89.2)	7 (10.8)
There should be some more in the box (WWSWSWWS).	29 (17.7)	135 (82.3)	30 (42.3)	41 (57.7)	52 (80)	13 (20)

*Percentages are written in parenthesis.

Table 4.38 above shows the frequency and percentage of strong/weak syllable alternation among the three categories of participants. The WSWSW pattern perceived in the native baseline's production of *congratulations* was realised in the speeches of 78.7% of the LTC, 94.4% of the MTC and 95.4% of the HTC. Only 4.9% of the LTC, 15.5% of the MTC and 50.8% of the HTC were able to produce the WSW pattern of the compound-headed nominal phrase, *a printout* while majority of the participants produced either WSS or SSS patterns. The native baseline WWS pattern of *a black bird* was realised in 5.5%, 15.5% and 56.2% of the LTC, the MTC and the HTC respectively. The respective appropriate alternation (SWWSWWSW) realised in the LTC, the MTC and the HTC production of *ask them to come to the party* were 67.1%, 62% and 89.2%. The

WWSWSWWS pattern of *there should be some more in the box* was produced by 17.7% of the LTC, 62% of the MTC and 80% of the HTC. Figure 4.19 displays the percentage of UIYTUs' appropriate strong/weak syllable alternation.

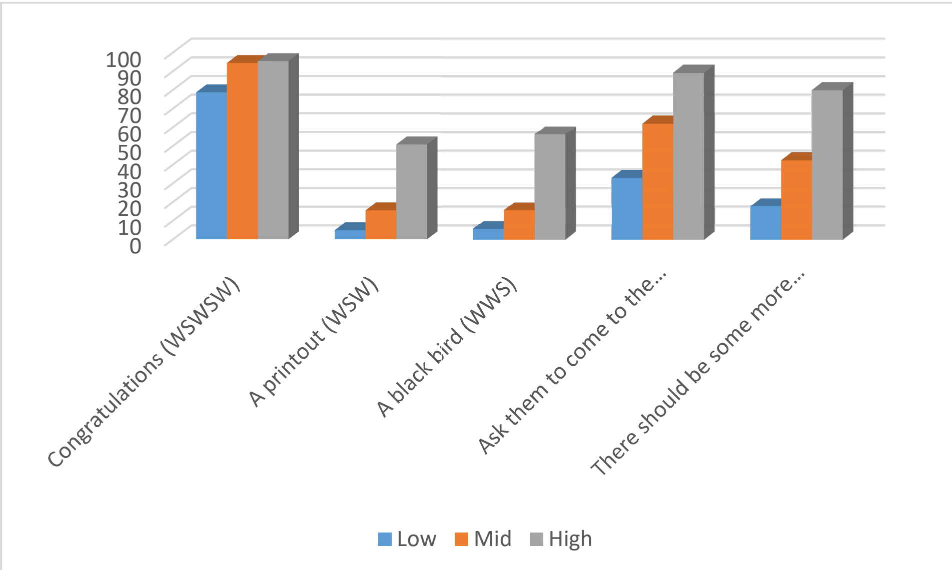


Figure 4.19: Percentage of strong/weak syllable alternation in the speeches of UIYTUs

Figure 4.19 shows the percentage of strong/weak syllable alternation in the speeches of UIYTUs. The higher the technology exposure, the higher the approximation to native English alternation of stressed and unstressed syllables.

Table 4.39: Analysis of variance for UIYTUs' stressed and unstressed syllable alternation

Level of technology contact	N	Mean	Std. deviation		
Low	164	3.65	2.53		
Mid	71	5.61	3.07		
High	65	7.29	2.74		
Total	300	4.90	3.09		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	666.530	2	333.265	45.29	.000
Within Groups	2185.666	297	7.359		

Total	2852.197	299

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The result of ANOVA for strong/weak syllable alternation in the English lexical and phrasal structures produced by UIYTUs with low, mid and high technology contact is presented in Table 4.39. While there was 3.65 mean strong/weak syllable alternation in the productions of the LTC, The MTC had a mean of 5.61 and the mean of appropriate alternation for the HTC was 7.29. Total mean of the 300 research participants was 4.90. The result shows that the influence of technology contact on strong/weak syllable alternation in the speeches of University of Ibadan Yoruba Teenage Undergraduates is statistically significant [$F_{(2, 297)} = 45.29$; $p < .05$]. By this result, the null hypothesis which states that alternation of stressed and unstressed syllables in the speeches of University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) does not significantly differ is rejected.

Table 4.40: Multiple (between-group) comparison for UIYTUs' strong/weak syllable alternation

(I) Level of technology contact	**(J) Level of technology contact**	**Mean difference (I-J)**	**Std. error**	**Sig.**	**95% confidence interval**	
					Lower bound	**Upper bound**
Low	Mid	-1.97*	.39	.000	-2.92	-1.03
	High	-3.65*	.40	.000	-4.62	-2.67
Mid	Low	1.97*	.39	.000	1.03	2.92
	High	-1.67*	.47	.002	-2.82	-.53
High	Low	3.65*	.40	.000	2.67	4.62
	Mid	1.68*	.47	.002	.53	2.82

*. The mean difference is significant at the 0.05 level.

The result of multiple comparison test done to ascertain between-group significant differences, presented in Table 4.40, reveals that UIYTUs with high technology contact significantly differ from UIYTUs with mid technology contact (MD = 1.68; p <.05) and UIYTUs with low technology contact (MD = 3.65; p <.05) in stressed and unstressed syllable alternation. In turn, UIYTUs with mid technology contact (MTC) alternated strong and weak syllables significantly better than the LTC (MD = 1.97; $p < .05$). Their distinctive categories are displayed in Table 4.40.

Table 4.41: Homogenous subset- categorisation of UIYTUs for strong/weak syllable alternation

Scheffe[a,b]

Level of technology contact	N	Subset for alpha = 0.05		
		1	2	3
Low	164	3.65		
Mid	71		5.62	
High	65			7.29
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets displayed in Table 4.41 shows that University of Ibadan Yoruba Teenage Undergraduates belong to different categories, given the dissimilarities of their means. This further establishes that the difference in the LTC, MTC and HTC's ability to alternate strong and weak syllables for Standard English rhythm is statistically significant. Figure 4.20 below illustrates their performance.

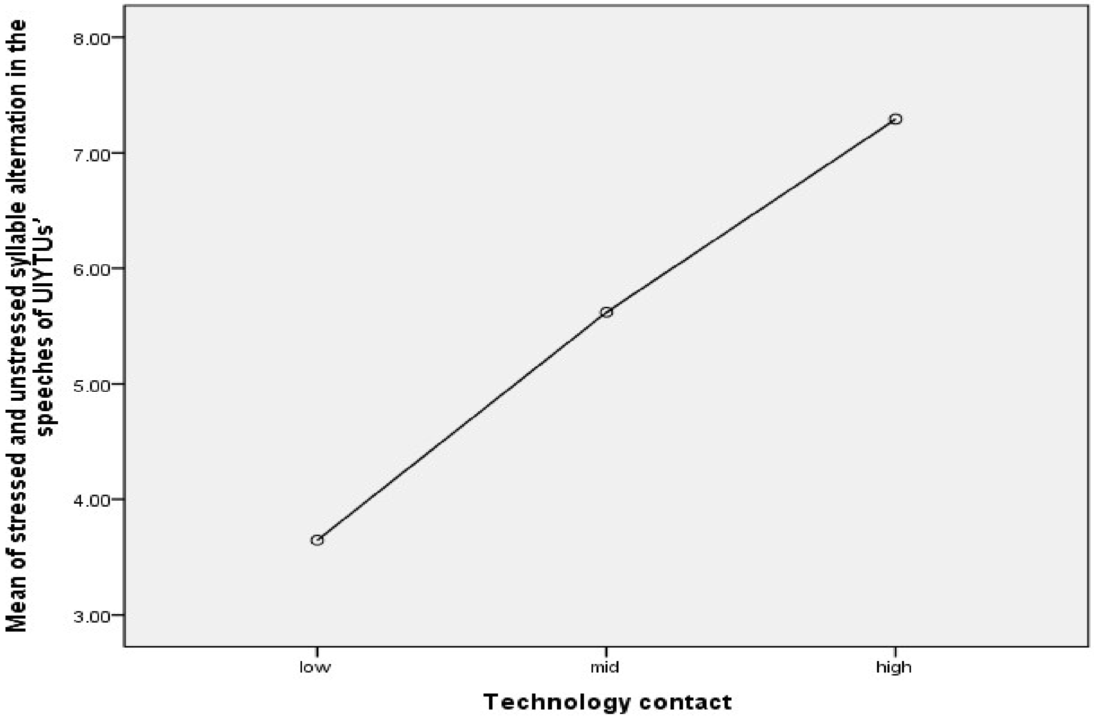


Figure 4.20: Mean of stressed and unstressed syllable alternation in the speeches of UIYTUs'

Figure 4.20 illustrates the mean of stressed and unstressed syllable alternation in the speeches of UIYTUs' in correspondence with their levels of technology contact. The distance between the mean points for each pair of the technology contact levels (high and mid/ mid and low) indicates that the difference in the mean of a higher technology contact level is strikingly higher than that of the next lower technology contact level.

4.2 Statistical analysis of the instrumental readings of selected expressions produced by UIYTUs

This section presents the result of analysis of variance for the instrumental readings of the pitch prominence in Hertz (Hz) and duration in milliseconds (ms) of selected expressions extracted from Speech Filing System (SFS/WASP) version 1.54. This analysis is aimed at augmenting the findings of the earlier analysis which was done with figures obtained based on the researcher's perception of the words/expressions produced by the UIYTUs.

4.2.1 Analysis of the pitch and duration of *-glo-* in *conglomerate*

Table 4.42: Analysis of variance for the pitch prominence of *-glo-* in *conglomerate*

Level of	N	Mean	Std. deviation

technology contact					
Low	164	208.52	34.08		
Mid	71	239.52	23.58		
High	65	261.19	31.94		
Total	300	227.27	38.21		
	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**
Between Groups	143048.725	2	71524.362	72.37	.000
Within Groups	293546.405	297	988.372		
Total	436595.130	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.42 above shows the result of analysis of variance for the pitch prominence readings for *-glo-* in *conglomerate* as produced by University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with low, mid and high technology contact. While there was 208.52Hz mean pitch prominence reading for the LTC, the MTC and the HTC had averages of 239.52Hz and 261.18Hz respectively. Total mean of pitch prominence for the 300 participants was 227.27Hz. The result shows a significant difference in the pitch of *-glo-,* the primarily stressed syllable of *conglomerate* [$F_{(2, 297)}$ = 72.366Hz; $p < .05$].

Table 4.43: Multiple (between-group) comparison for the pitch prominence of *-glo-*

(I) Level of technology contact	**(J) Level of technology contact**	**Mean difference (I-J)**	**Std. error**	**Sig.**	**95% confidence interval**	
					Lower bound	**Upper bound**
Low	Mid	-30.99*	4.47	.000	-41.98	-20.01
	High	-52.66*	4.61	.000	-63.99	-41.32
Mid	Low	30.99*	4.47	.000	20.01	41.98
	High	-21.66*	5.40	.000	-34.94	-8.39
High	Low	52.66*	4.61	.000	41.32	63.99
	Mid	21.66*	5.40	.000	8.39	34.94

*. The mean difference is significant at the 0.05 level.

Table 4.43 shows the result of multiple comparison test performed to identify where exactly the established significant difference(s) is/are. The table reveals that the average pitch at which *-glo-* was produced by the HTC is significantly higher than the average pitch obtained for the MTC (MD = 21.66Hz; $p <.05$). Also, the average pitch obtained for the MTC is remarkably higher than that obtained for the LTC (MD = 30.99Hz; $p <.05$). Therefore, the established significant differences exist among the three levels of technology contact for the pitch of *-glo-*.

Table 4.44: Analysis of variance for the duration of *-glo-* in *conglomerate*

Level of technology contact	N	Mean	Std. deviation		
Low	164	200.79	21.47		
Mid	71	223.24	23.63		
High	65	264.68	27.91		
Total	300	219.95	34.467		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	190989.050	2	95494.525	172.87	.000
Within Groups	164064.096	297	552.404		
Total	355053.147	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.44 shows the result of ANOVA of the duration (ms) obtained for *-glo-* in *conglomerate* as produced by University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with low, mid and high technology contact. On average, the LTC produced the syllable in 200.79ms. A mean duration of 223.24ms was obtained for the MTC and the HTC had an average duration of 264.68ms. Total mean of the duration for the 300 participants was 219.95ms. The result shows a significant difference in the duration of *-glo-,* as produced by the three groups [$F_{(2, 297)} = 172.871$ms; $p < .05$].

Table 4.45: Multiple (between-group) comparison for the duration of *-glo-*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Low	Mid	-22.45*	3.34	.000	-30.66	-14.23
	High	-63.88*	3.45	.000	-72.36	-55.41
Mid	Low	22.45*	3.34	.000	14.23	30.66
	High	-41.44*	4.03	.000	-51.36	-31.51
High	Low	63.88*	3.45	.000	55.41	72.36
	Mid	41.44*	4.04	.000	31.51	51.36

*. The mean difference is significant at the 0.05 level.

Having established significant differences in the duration of *-glo-*, two of the groups were compared at a time to find out whether or not the differences exist among all the groups. The result in table 4.45 reveals that the average duration for the production of *-glo-* by the HTC is significantly longer than that of the MTC (MD = 41.44ms; p <.05). Also, the average duration obtained for the MTC is longer than that obtained for the LTC (MD = 22.45ms; p <.05). Therefore, the established significant differences exist among the three levels of technology contact.

4.2.2. Analysis of the pitch and duration difference of *blackbird* (compound)/ *black bird* (noun phrase)

To establish significant differences in the stress pattern of *blackbird* and *black bird* as produced by UIYTUs, a reading of the pitch prominence and duration of *black* in both utterances was done with the expectation that the pitch and duration of *black-* in the compound will be higher and longer respectively than *black* in the phrase. The difference in the figures obtained for both is then analysed for variance. The results are presented below:

Table 4.46: Analysis of variance for the pitch difference between *black-* in *blackbird* and *black* in *black bird*

Level of technology contact	N	Mean	Std. deviation		
Low	164	19.99	.16		
Mid	71	15.97	.24		
High	65	22.19	5.96		
Total	300	19.51	3.50		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	1391.243	2	695.621	90.71	.000
Within Groups	2277.704	297	7.669		
Total	3668.947	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.46 presents the result of ANOVA for average pitch difference of *black-* in *blackbird* (compound noun) and *black bird* (phrase).to establish significant difference in UIYTUs' use of stress to distinguish between compound nouns and phrases. The LTC had a mean pitch difference of 19.99Hz. The MTC had a mean pitch difference of 15.97Hz while a mean pitch difference of 22.19Hz was realised for the HTC. Total mean of the pitch difference for all participants was 19.51Hz. Given that $F_{(2,\ 297)} = 90.71$; $p < .05$, level of technology contact is influential on UIYTUs' use of pitch prominence as an acoustic correlate of stress distinction between *blackbird*(compound noun) and *black bird* (phrase).

Table 4.47: Multiple (between-group) comparison UIYTUs' pitch difference between *black-* in *blackbird* and *black* in *black bird*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	4.02*	.39	.000	3.05	4.98
	High	-2.20*	.41	.000	-3.20	-1.20
Mid	Low	-4.02*	.39	.000	-4.98	-3.05
	High	-6.21*	.48	.000	-7.38	-5.04
High	Low	2.20*	.41	.000	1.20	3.20
	Mid	6.21*	.48	.000	5.04	7.38

*. The mean difference is significant at the 0.05 level.

The result of the multiple comparison for the mean of pitch difference among the three groups presented in Table 4.47 shows that the significant difference established in Table 4.46 is found among the three levels of technology contact. The result reveals that the HTC significantly differ from the MTC in their use of pitch prominence to distinguish stress between compound nouns and phrases (MD = 6.21Hz; p <.05). In the same vein, the difference in pitch prominence of the HTC is significantly higher that of the LTC (MD = 2.20Hz; p <.05). The pitch prominence of the MTC is also higher than that of the MTC (MD = -4.02Hz; p <.05).

Table 4.48: Analysis of variance for the duration difference between *black-* in *blackbird* and *black* in *black bird*

Level of technology contact	N	Mean	Std. deviation		
Low	164	69.02	.31		
Mid	71	61.90	61.27		
High	65	39.00	.00		
Total	300	60.83	31.93		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	42069.454	2	21034.727	53.99	.000
Within Groups	262824.212	297	884.930		
Total	304893.667	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Generally, *black bird* was produced as a nominal phrase (NP) where the second element of the NP was, as expected, was produced with longer duration comparable to the first. A reversal of the order expected in *blackbird* was not quite realised as established by the perceptual analysis. Therefore, rather than subtracting the duration of the second vowel (V2) from the duration of the first vowel (V1) of the compound,the duration of V1 was subtracted from that of V2 as doing the former, most often, resulted in negative figures. The result of ANOVA for the duration difference between V2 and V1 presented in Table 4.48 shows that the LTC had a mean duration difference of 69.02ms. The MTC had a mean duration difference of 61.90ms while a mean of 39ms was obtained for the HTC. Total mean of the duration difference realised for all the participants was 60.83ms. Given $F_{(2, 297)} = 90.705$; $p < .05$, there is a significant difference in the mean of V2-V1. The level of technology contact therefore influences UIYTUs' use of duration as an acoustic correlate of stress distinction between *blackbird* as a compound noun and *black bird* (phrase).

Table 4.49: Multiple (between-group) comparison UIYTUs' duration difference between *black-* in *blackbird* and *black* in *black bird*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	7.12	4.23	.243	-3.27	17.52
	High	30.02*	4.36	.000	19.30	40.75
Mid	Low	-7.12	4.23	.243	-17.52	3.27
	High	22.90*	5.11	.000	10.34	35.47
High	Low	-30.02*	4.36	.000	-40.75	-19.30
	Mid	-22.90*	5.11	.000	-35.47	-10.34

*. The mean difference is significant at the 0.05 level.

The result of multiple comparison aimed at ascertaining between-group significant differences is presented in Table 4.49. The result reveals that the difference between the duration of V2 and V1 obtained for UIYTUs with high technology contact (HTC) is significantly lower than those obtained for the MTC (MD = -22.90ms; $p < .05$) and the LTC (MD = -30.02; $p < .05$). Although the duration difference between V2 and V1 realised for UIYTU with mid technology contact (MTC) is lower than that obtained for UIYTUs with low technology contact (LTC), the difference between the two groups shows no significance. Therefore, the significant difference established in table 4.48 only exists between the HTC and the two other groups.

4.2.3 Analysis of the pitch and duration of *par-* in *Ask them to come to the party*

Table 4.50: Analysis of variance for UIYTUs' pitch prominence of *par-* in *Ask them to come to the party*

Level of technology contact	N	Mean	Std. deviation
Low	164	107.02	38.73
Mid	71	196.48	12.46
High	65	263.88	.99
Total	300	162.18	71.07

	Sum of squares	Df	Mean square	F	Sig.
Between Groups	1254683.644	2	627341.822	729.39	.000
Within Groups	255448.636	297	860.096		
Total	1510132.280	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Result of the pitch reading for *par-*,the nuclearly stressed syllable of *Ask them to come to the party* is presented in Table 4.50. the result shows mean pitch reading of 107.02Hz for UIYTU with low technology contact. UIYTUs with mid technology contact had a mean pitch of 196.48Hz while 263.88Hz mean pitch obtained for UIYTUs with high technology contact. The total mean pitch reading for all the participants is 182.18Hz. The result shows significant differences in the pitch readings of the three categories of technology contact [$F_{(2,297)}$ =729.385: $p < .05$].

Table 4.51: Multiple (between-group) comparison for UIYTUs' pitch prominence of *par-* in *Ask them to come to the party*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	-89.46*	4.17	.000	-99.70	-79.21
	High	-156.85*	4.30	.000	-167.43	-146.28
Mid	Low	89.46*	4.17	.000	79.21	99.70
	High	-67.40-*	5.04	.000	-79.78	-55.01
High	Low	156.85*	4.30	.000	146.28	167.43
	Mid	67.40*	5.04	.000	55.01	79.78

*. The mean difference is significant at the 0.05 level.

Table 4.51 presents the result of multiple comparison to establish significant differences in the pitch readings between each pair of the technology contact groups. The result shows that the differences established in Table 4.49 is significant among the three groups. UIYTUs with high technology contact (HTC) had a significantly higher pitch reading than UIYTUs with mid technology contact (MD = 67.40Hz; $p < .05$) who, in turn, had a significantly higher pitch reading than the UIYTU with low technology contact (MD = 89.46Hz; $p < .05$).

Table 4.52: Analysis of variance for UIYTUs' duration of *par-* in *Ask them to come to the party*

Level of technology contact	N	Mean	Std. deviation		
Low	164	114.98	38.11		
Mid	71	122.54	21.36		
High	65	136.87	15.01		
Total	300	121.51	31.96		
	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**
Between Groups	22395.668	2	11197.834	11.75	.000
Within Groups	283051.318	297	953.035		
Total	305446.987	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.52 shows the mean duration of *par-* in *Ask them to come to the party* as produced by the UIYTUs. The mean duration obtained for the UIYTUs with low technology contact (LTC) is 114.98ms. The UIYTUs with mid technology contact (MTC) produced the syllable in 122.54ms on the average while the UIYTUs with high technology contact (HTC) had a mean duration reading of 136.87ms. The mean duration of *par-* for the three hundred participants is 121.51ms. The result shows significant difference in the duration of the syllable as produced by the three groups [$F_{(2,297)} = 11.75$: $p < .05$].

Table 4.53: Multiple (between-group) comparison for UIYTUs' duration of *par-* in *Ask them to come to the party*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	-7.56	4.39	.228	-18.35	3.23
	High	-21.89*	4.53	.000	-33.02	-10.75
Mid	Low	7.56	4.39	.228	-3.23	18.35
	High	-14.33*	5.30	.027	-27.36	-1.29
High	Low	21.89*	4.53	.000	10.75	33.02
	Mid	14.33*	5.30	.027	1.29	27.36

*. The mean difference is significant at the 0.05 level.

Table 4.53 presents the result of multiple comparison to establish significant differences in the duration readings of *par-* between each pair of the groups. The result shows that the differences established in Table 4.51 is significant only between UIYTUs with high technology contact (HTC) and the other groups as the participants of this group produced the syllable with significantly longer duration than the UIYTUs with mid technology contact (MD = 14.33ms; $p < .05$) and the UIYTUs with low technology contact (MD = 21.89ms; $p < .05$). Although the mean duration realised for UIYTUs with mid technology contact is longer than the duration obtained for UIYTUs with low technology contact, the mean difference is not statistically significant (MD = 7.56ms; $p < .05$).

4.2.4 Analysis of the pitch and duration of*great* in *That was a GREAT idea*

Table 4.54: Analysis of variance for UIYTUs' pitch prominence of *great* in *That was a GREAT idea*

Level of technology contact	N	Mean	Std. deviation	
Low	164	198.83	23.426	
Mid	71	230.23	20.26	
High	65	249.08	24.81	
Total	300	217.15	31.20	
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	133441.317	2	66720.659	125.76	.000
Within Groups	157568.229	297	530.533		
Total	291009.547	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The pitch of *great* was measured in *That was a GREAT idea* to ascertain any significant differences in UIYTUs' ability to reassign nuclear stress to focused words for contrastive purposes. Table 4.54 shows the result of ANOVA for the pitch readings of the contrastively stressed syllable as produced by UIYTUs. The mean pitch reading realised for the LTC is 198.83Hz. UIYTUs with mid technology contact produced it at a mean pitch of 230.23Hz while249.08Hz was realised for the UIYTUs with high technology contact. Total mean of the pitch reading for the 300 participants was 217.15Hz. This result shows a significant difference in UIYTUs' use of pitch as a correlate to reassign stress to focused words [$F_{(2,297)} = 125.76$: $p < .05$]. Therefore, technology-based non-enculturation sources of native English to which the UIYTUs are exposed influences their ability to reassign stress to contrastively stressed syllables.

Table 4.55: Multiple (between-group) comparison for UIYTUs' pitch prominence of *great* in *That was a great idea*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	-31.40*	3.27	.000	-39.45	-23.35
	High	-50.25*	3.38	.000	-58.55	-41.94
Mid	Low	31.40*	3.27	.000	23.35	39.45
	High	-18.85*	3.95	.000	-28.58	-9.12
High	Low	50.25*	3.38	.000	41.94	58.55
	Mid	18.85*	3.95	.000	9.12	28.58

*. The mean difference is significant at the 0.05 level.

Having proved that there is a significant difference in UIYTUs' ability to use pitch as a cue to reassign stress for contrastive purposes, multiple comparison test was performed to establish significant difference(s) between each pair of the groups. The result displayed in Table 4.55 above confirms that UIYTUs with high technology contact produced *great* at a significantly higher pitch than UIYTUs with mid technology contact (MD = 18.85Hz; $p < .05$) and UIYTUs with low technology contact (MD = 50.25Hz; $p < .05$). In the same vein, the mean pitch reading of the UIYTUs with mid technology contact is significantly higher than that of the UIYTUs with low technology contact (MD = 31.40Hz; $p < .05$). Therefore, established significant differences exist among the three levels of technology contact for pitch as cue to nuclear stress reassignment on appropriate syllable of focused words.

Table 4.56: Analysis of variance for UIYTUs' duration of *great* in *That was a GREAT idea*

Level of technology contact	N	Mean	Std. deviation		
Low	164	185.05	39.04		
Mid	71	223.63	47.47		
High	65	299.11	9.17		
Total	300	218.89	58.39		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	607682.252	2	303841.126	219.24	.000
Within Groups	411604.335	297	1385.873		
Total	1019286.587	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.56 shows the result of ANOVA for the duration readings of *great,* the contrastively stressed syllable in *That was a GREAT idea*. The mean duration reading realised for the LTC is 185.05ms. The MTC produced the syllable at a mean duration of 223.63ms while299.11ms was realised for the HTC. Total mean of the pitch reading for the 300 participants was 218.89ms. This result shows a significant difference in UIYTUs' use of duration as a cue to reassign stress to focused words [$F_{(2,297)}$ =219.24: $p < .05$]. Therefore, technology-based non-enculturation sources of native English to which UIYTUs are exposed influences their ability to reassign stress to contrastively stressed syllables.

Table 4.57: Multiple (between-group) comparison for UIYTUs' duration of *great* in *That was a GREAT idea*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	-38.59*	5.29	.000	-51.60	-25.57
	High	-114.06*	5.46	.000	-127.48	-100.64
Mid	Low	38.59*	5.29	.000	25.57	51.60
	High	-75.47*	6.39	.000	-91.20	-59.75
High	Low	114.06*	5.46	.000	100.64	127.48
	Mid	75.47*	6.39	.000	59.75	91.20

*. The mean difference is significant at the 0.05 level.

Table 4.57 presents the result of multiple comparison to establish significant differences in the duration readings of *great* between each pair of the groups. The result shows that the differences established in Table 4.56 is significant among all the pairs. UIYTUs with high technology contact produced the syllable with significantly longer duration than UIYTUs with mid technology contact (MD = 75.47ms; $p < .05$) and UIYTUs with low technology contact (MD = 114.06ms; $p < .05$). Also, the mean duration readings obtained for UIYTUs with mid technology contact is longer than that realised for UIYTUs with low technology contact (MD = 38.59ms; $p < .05$).

4.2.5 Analysis of the duration of reduced vowels

Table 4.58: Analysis of variance for the duration of /ə/ in *tomorrow*

Level of technology contact	N	Mean	Std. deviation	
Low	164	161.98	3.92	
Mid	71	147.35	4.01	
High	65	116.03	4.55	
Total	300	148.56	18.59	
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	98399.882	2	49199.941	2947.21	.000
Within Groups	4958.038	297	16.694		
Total	103357.920	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.58 shows the result of ANOVA for the duration of *to-* in *tomorrow* as produced by UIYTUs. While the mean duration for the LTC was 161.98ms, the MTC had a mean duration reading of 147.35ms. The HTC produced the syllable within 116.03ms on the average. Total mean of the 300 research participants was 148.56ms. The result shows that there is statistical significant influence of technology contact on the duration of the weak vowel in *tomorrow* as rendered by UIYTUs [$F_{(2, 297)} = 2947.21$; $p < .05$].

Table 4.59: Analysis of variance for UIYTUs' duration of *the*

Level of technology contact	N	Mean	Std. deviation
Low	164	231.65	6.68
Mid	71	118.39	10.83
High	65	84.15	7.06
Total	300	172.89	66.13

	Sum of squares	Df	Mean square	F	Sig.
Between Groups	1288966.762	2	644483.381	10258.62	.000
Within Groups	18658.608	297	62.824		
Total	1307625.370	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.59 shows the result of analysis of variance for UIYTUs' duration of *the* in their production of ***The** children's conduct during the concert was excellent*. The respective mean duration realised for the LTC, the MTC and the HTC were 231.65ms, 118.39ms and 84.15ms. Total mean duration for all participants' productions was 172.89ms. Given $F_{(2, 297)} = 10258.620$; $p < .05$, there is a significant difference in the duration of *the* among the three groups showing that the level of technology contact influences UIYTUs' ability to reduce vowels.

Table 4.60: Analysis of variance for the duration of inserted /ɪ/ in *threaten*

Level of technology contact	N	Mean	Std. deviation		
Low	164	156.34	15.43		
Mid	71	98.92	15.91		
High	65	65.51	11.52		
Total	300	123.07	41.03		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	438342.913	2	219171.456	1001.37	.000
Within Groups	65004.617	297	218.871		
Total	503347.530	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Due to cases of vowel insertion or substitution in positions where syllabic consonants were supposed to be the peak of weak syllables established in sections 4.1.5, 4.2.5.6 and 4.2.5.7, the duration of the syllable with syllabic consonants as peaks and the vowels that were either inserted or were substituted for the syllabic consonants in the unstressed syllables were measured. The result for the mean duration of *-ten* in *threaten* presented in Table 4.60 above shows a mean duration of 156.34ms for the LTC, 98.92ms for the MTC and 65.51ms for the HTC. Mean duration for all participants was 123.07ms. This result shows that the extent to which UIYTUs are exposed to technology-based non-enculturation sources of contact with native English wields some influence on the duration of weak syllables peaked by syllabic consonants [$F_{(2, 297)}$ = 1001.374; $p < .05$].

Table 4.61: Multiple (between-group) comparison for UIYTUs' duration of reduced vowels

Dependent variable	(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Tomorrow (content word)	Low	Mid	14.62*	.58	.000	13.20	16.05
		High	45.95*	.60	.000	44.47	47.42
	Mid	Low	-14.62*	.58	.000	-16.05	-13.60
		High	31.32*	.70	.000	29.60	33.05
	High	Low	-45.95*	.60	.000	-47.42	-44.47
		Mid	-31.32*	.70	.000	-33.05	-29.60
The (grammatical word)	Low	Mid	113.26*	1.13	.000	110.49	116.03
		High	147.50*	1.16	.000	144.64	150.36
	Mid	Low	-113.26*	1.13	.000	-116.03	-110.49
		High	34.24*	1.36	.000	30.89	37.59
	High	Low	-147.50*	1.16	.000	-150.36	-144.64
		Mid	-34.24*	1.36	.000	-37.59	-30.89
Threaten (Syllabic consonant as peak)	Low	Mid	57.43*	2.10	.000	52.26	62.60
		High	90.83*	2.17	.000	85.50	96.17
	Mid	Low	-57.43*	2.10	.000	-62.60	-52.26
		High	33.41*	2.54	.000	27.16	39.66
	High	Low	-90.83*	2.17	.000	-96.17	-85.50
		Mid	-33.41*	2.54	.000	-39.66s	-27.16

*. The mean difference is significant at the 0.05 level.

Table 4.61 shows that the duration of *to-* in *tomorrow* (content word), *the* (grammatical word) and *-ten,* syllable with syllabic consonant as peak (as well as the vowel inserted before the syllabic consonant) significantly differ in all the items measured and from group to group. For *to-,* the mean duration realised for the HTC was significantly lower than that obtained for the MTC

(MD = -31.32ms; p <.05). In turn, the mean duration for the MTC was significantly lower than that of the LTC (MD = -14.62ms; p <.05). Mean duration difference between the HTC and the MTC for *the* also shows a significant reduction as level of technology contact increases (MD = -34.24ms; p <.05). Also, the mean difference between the MTC and the LTC is statistically significant (MD = -113.26ms; p <.05). On readings for syllabic consonant as peak of weak syllable and inserted vowel (where such occurred), lower mean durations were realised as technology contact level progressed between the HTC and the MTC (MD = -33.41ms; p <.05) and between the MTC and the LTC (MD = -57.43ms; p <.05).

4.2.6 Analysis of the pitch and duration readings for stress shift

Table 4.62: Analysis of variance for the difference in pitch of -*fec*- and *per*- in *perfection*

Level of technology contact	N	Mean	Std. deviation
Low	164	-2.88	5.28
Mid	71	17.33	5.17
High	65	21.29	7.77
Total	300	7.14	12.55

	Sum of squares	Df	Mean square	F	Sig.
Between Groups	36841.564	2	18420.782	532.48	.000
Within Groups	10274.556	297	34.594		
Total	47116.120	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The suffix (-*ion*) addition to *perfect* necessitates a shift of the primary stress from *per*- to *fec*- in *perfection.* To instrumentally ascertain whether or not UIYTUs shifted stress as required, the differences between the pitch of syllable 2 (-*fec-)* and syllable 1 (*per*-) were obtained for participants of the three technology contact levels. Table 4.62 shows the result of analysis of variance of the pitch difference in the two syllables for all the participants. Mean pitch difference for the LTC was -2.88Hz. The MTC had 17.33Hz while the realised pitch difference for the HTC was 21.29Hz. Total mean obtained for the 300 research participants was 7.14Hz. The result establishes a significant statistical difference in UIYTUs' use of pitch as a cue to shift stress as a result of suffixation [$F_{(2, 297)} = 532.48$; $p < .05$].

Table 4.63: Analysis of variance for the difference in duration of -*fec*- and *per*- in *perfection*

Level of technology contact	N	Mean	Std. deviation		
Low	164	1.11	4.92		
Mid	71	-20.24	28.87		
High	65	43.03	24.70		
Total	300	5.14	28.51		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	141717.228	2	70858.614	207.68	.000
Within Groups	101334.892	297	341.195		
Total	243052.120	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.63 shows the result of the duration difference between -*fec*- and *per*- in *perfection* for UIYTUs of the three technology contact levels. From the table, mean duration difference for the LTC was 1.11ms. The UIYTUs with mid technology contact had -20.24ms while the realised mean duration difference for the HTC was 43.03ms. Total mean duration difference for the 300 research participants was 5.14ms. The result shows that there is a significant difference in UIYTUs' use of duration to shift stress as a result of suffixation [$F_{(2, 297)} = 207.678$; $p < .05$].

Table 4.64: Analysis of variance for the difference in pitch of *con- 1 (n)* and *con- 2 (v)* in *conduct*

Level of technology contact	N	Mean	Std. deviation		
Low	164	-7.17	7.75		
Mid	71	18.73	12.28		
High	65	19.34	11.68		
Total	300	4.70	16.37		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	51018.908	2	25509.454	260.66	.000
Within Groups	29065.689	297	97.864		
Total	80084.597	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

To instrumentally establish any significant difference(s) in UIYTUs' ability to shift stress in variable words, the pitch and duration of *con-* in *conduct* both as a noun (*con- 1*) and as a verb (*con- 2*) were measured. Based on the native baseline production, the pitch and the duration of *con 1* are respectively expected to be higher and longer than *con 2*. The readings of *con 2* subtracted from *con 1* were obtained for all participants. The result of analysis of variance (ANOVA) for the pitch difference between *con 1* and *con 2* is presented in Table 4.64. The mean pitch difference obtained for the LTC is -7.17Hz suggesting that the total pitch value of *con 2* for this group was greater than the total for *con 1*. The mean pitch value obtained for the MTC is 18.73Hz while the mean value for the HTC 19.34Hz. Mean pitch difference for all the participants is 4.70Hz. The result establishes a significant difference [$F_{(2, 297)} = 260.662$; $p < .05$].

Table 4.65: Analysis of variance for the difference in the duration of *con- 1 (n)* and *con- 2 (v)* in *conduct*

Level of technology contact	N	Mean	Std. deviation		
Low	164	14.76	8.47		
Mid	71	-13.61	17.98		
High	65	67.69	28.74		
Total	300	19.52	32.70		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	232458.387	2	116229.194	395.97	.000
Within Groups	87178.530	297	293.530		
Total	319636.917	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Result of analysis of variance for the difference in the duration of *con 1* and *con 2* is presented in Table 4.65. The result shows a mean duration difference of 14.76ms for UIYTUs with low technology contact. Mean duration value obtained for the UIYTUs with mid technology contact is -13.61ms suggesting that the total duration value of *con 2* for this group was greater than the total duration of *con 1* contrary to the native baseline duration difference. The mean value for the UIYTUs with high technology contact is 67.69ms while the mean difference realised for all the participants is 19.52ms. The result establishes a significant difference [$F_{(2, 297)} = 395.970$; $p < .05$].

Table 4.66: Analysis of variance for the difference in the pitch of *-teen 1(Mary is thirteen)* and *-teen 2 (She was thirteen yesterday)*

Level of technology contact	N	Mean	Std. deviation		
Low	164	-17.87	11.55		
Mid	71	17.24	7.67		
High	65	18.54	8.48		
Total	300	-1.67	20.48		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	94950.198	2	47475.099	462.66	.000
Within Groups	30476.132	297	102.613		
Total	125426.330	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

In phrasal categories with adjacent stressed syllables resulting in stress clash, the rhythm rule is required to space out stresses. This is done in the English language by shifting the first stress leftward. This phenomenon was examined in two statements produced by UIYTUs- *Mary is thir**teen** (1)* and *She was thir**teen** (2) yesterday*. The pitch and duration of *-teen 1* and *-teen 2* were measured for the UIYTUs. From the native baseline production, *-teen 1* was higher in pitch and longer in duration than *-teen 2*. Thus, the differences between the pitch and the duration of *-teen 1* and *-teen 2* were obtained. Table 4.66 presents the analysis of variance result for the pitch difference between the two syllables for UIYTUs. The result shows a mean pitch difference of -17.87Hz for the LTC, 17.24Hz for the MTC and 18.54Hz for the HTC. The mean for all participants is -1.67Hz. There is a significant difference in the mean pitch difference between *-teen 1* and *-teen 2* [$F_{(2, 297)} = 462.66$; $p < .05$].

Table 4.67: Analysis of variance for the difference in the duration of *-teen 1(Mary is thirteen)* and *-teen 2 (She was thirteen yesterday)*

Level of technology contact	N	Mean	Std. deviation		
Low	164	-1.38	33.10		
Mid	71	8.14	2.34		
High	65	43.08	27.17		
Total	300	10.51	32.65		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	92515.219	2	46257.609	60.75	.000
Within Groups	226159.768	297	761.481		
Total	318674.987	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.67 displays the result of ANOVA for the difference in the duration of *-teen 1* and *-teen 2*. The result shows a mean duration difference of -1.38ms for the LTC, suggesting that the duration of *-teen 2* was longer than *-teen 1* in contrast to the NB rendition. Mean duration value obtained for the MTC is 8.14ms while the mean value for the HTC was 43.08ms. The mean difference realised for all the participants is 10.51ms. The result establishes a significant difference [$F_{(2, 297)} = 60.75; p < .05$].

Table 4.68: Multiple (between-group) comparison for UIYTUs' pitch value for stress shift

Dependent variable	(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
						Lower bound	Upper bound
Perfection (Suffixation)	Low	Mid	-20.20*	.84	.000	-22.26	-18.15
		High	-24.17*	.86	.000	-26.29	-22.05
	Mid	Low	20.20*	.84	.000	18.15	22.26
		High	-3.97*	1.01	.001	-6.45	-1.48
	High	Low	24.17*	.86	.000	22.05	26.29
		Mid	3.97*	1.01	.001	1.48	6.45
Conduct (Variable word)	Low	Mid	-25.90*	1.41	.000	-29.36	-22.45
		High	-26.51*	1.45	.000	-30.08	-22.94
	Mid	Low	25.90*	1.41	.000	22.45	29.36
		High	-.61	1.70	.938	-4.78	3.57
	High	Low	26.51*	1.45	.000	22.94	30.08
		Mid	.61	1.70	.938	-3.57	4.78
She was thirteen yesterday (Iambic reversal)	Low	Mid	-35.11*	1.44	.000	-38.65	-31.57
		High	-36.40*	1.48	.000	-40.06	-32.75
	Mid	Low	35.11*	1.44	.000	31.57	38.65
		High	-1.30	1.74	.757	-5.58	2.98
	High	Low	36.40*	1.48	.000	32.75	40.06
		Mid	1.30	1.74	.757	-2.98	5.58

*. The mean difference is significant at the 0.05 level.

Table 4.68 shows that the pitch readings for stress shift in *perfection* significantly differ from group to group. The mean pitch readings realised for the HTC was significantly higher than that obtained for the MTC (MD = 3.97Hz; $p < .05$). In turn, the mean pitch difference for the MTC was significantly higher than that of the LTC (MD = 20.20Hz; $p < .05$). Mean pitch difference for *con 1* and *con 2* in *conduct* between the HTC and the MTC shows no significance (MD = .61Hz; p <.05) while the mean difference between the HTC and the LTC is significant (MD = 26.51Hz; p <.05). The pitch readings for the MTC is significantly higher than that obtained for the LTC (MD = 25.90Hz; p <.05). On readings for the pitch difference between *-teen 1* and *-teen 2,* the established difference is only significant between the HTC and the LTC (MD = 36.40Hz; p <.05) and between the MTC and the LTC (MD = 35.11Hz; p <.05). The mean pitch difference between the HTC and the MTC is not statistically significant (MD = 1.30Hz; p <.05).

Dependent variable	**(I) Level of technology contact**	**(J) Level of technology contact**	**Mean difference (I-J)**	**Std. error**	**Sig.**	**95% Confidence interval**	
						Lower bound	**Upper bound**
Perfection (suffixation)	Low	Mid	21.35*	2.624	.000	14.89	27.80
		High	-41.92*	2.707	.000	-48.58	-35.26
	Mid	Low	-21.35*	2.624	.000	-27.80	-14.89
		High	-63.27*	3.171	.000	-71.07	-55.47
	High	Low	41.92*	2.701	.000	35.26	48.58
		Mid	63.27*	3.171	.000	55.47	71.07
Conduct (variable word)	Low	Mid	28.37*	2.434	.000	22.38	34.36
		High	-52.93*	2.511	.000	-59.10	-46.75
	Mid	Low	-28.37*	2.434	.000	-34.36	-22.38
		High	-81.30*	2.941	.000	-88.53	-74.06
	High	Low	52.93*	2.511	.000	46.75	59.11
		Mid	81.30*	2.941	.000	74.06	88.53
She was thirteen yesterday (iambic reversal)	Low	Mid	-9.52	3.92	.054	-19.16	.13
		High	-44.46*	4.05	.000	-54.40	-34.51
	Mid	Low	9.52	3.92	.054	-.13	19.16
		High	-34.94*	4.74	.000	-46.59	-23.28
	High	Low	44.46*	4.05	.000	34.51	54.41
		Mid	34.94*	4.74	.000	23.28	46.59

Table 4.69: Multiple (between-group) comparison for UIYTUs' duration for stress shift

*. The mean difference is significant at the 0.05 level.

Table 4.69 shows that the afore-established significant differences in the duration readings for lexical and phrasal categories where stress shift is expected occurred in all the three utterances and among all the groups except in *...thirteen yesterday*. For stress shift that occurred as a result of suffixation (*perfection*), the value of mean duration difference realised for the HTC was higher than that obtained for the MTC (MD = 63.27ms; p <.05). In turn, the value realised for the MTC was higher than the obtained for the LTC (MD = -21.35ms; p <.05). The values obtained for variable words (*conduct N/V*) significantly differ among all the groups given the mean difference between the HTC and the MTC (MD = 81.30ms; p <.05) and between the MTC and the LTC (MD = 52.93ms; p <.05). However, the established difference for iambic feet reversal is only significant between the HTC and the other groups. Although the MTC performed better than the LTC, the mean duration difference is not significant (MD = 9.52ms; p <.05).

4.2.7 Analysis of the duration of retained vowel

Table 4.70: Analysis of variance for UIYTUs' duration of retained /ɛ/ in *strawberry*

Level of technology contact	**N**	**Mean**	**Std. deviation**		
Low	164	62.56	69.44		
Mid	71	36.96	61.14		
High	65	11.30	22.20		
Total	300	45.39	63.57		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	128940.545	2	64470.272	17.74	.000
Within Groups	1079260.825	297	3633.875		
Total	1208201.370	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

The result of analysis of variance for the duration of retained /ɛ/ in *strawberry* in the speeches of UIYTUs with low technology contact (LTC), mid technology contact (MTC) and high technology contact (HTC) is displayed in Table 4.70. The table shows that the mean duration realised for the retained /ɛ/in the productions of the LTC was 62.56ms. Mean duration of 36.96ms and 11.30ms were respectively realised for the MTC and the HTC. Mean duration of the retained /ɛ/ for all the 300 research participants was 45.39. The result shows that the difference in UIYTUs' ability to elide segment appropriately is statistically significant [$F_{(2, 297)} = 17.74$ms; $p < .05$].

Table 4.71: Multiple (between-group) comparisons for the duration of retained /ɛ/ in *strawberry*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	25.60*	8.56	.012	4.53	46.67
	High	51.27*	8.84	.000	29.53	73.00
Mid	Low	-25.60*	8.56	.012	-46.67	-4.53
	High	25.67*	10.35	.048	.2072	51.13
High	Low	-51.27*	8.84	.000	-73.00	-29.53
	Mid	-25.67*	10.35	.048	-51.12	-.21

*. The mean difference is significant at the 0.05 level.

Result of the multiple comparison test to determine significant differences between each pair of the categories of UIYTUs for the duration of the retained /ɛ/ in *strawberry* is presented in Table 4.71. The result reveals that there is a significant mean difference between UIYTUs with high technology contact and UIYTUs with mid technology contact (MD= -25.67ms; $p <.05$) and between UIYTUs with high technology contact and UIYTUs with low technology contact (MD = -51.27; $p <.05$). Mean difference between UIYTUs with mid technology contact and UIYTUs with low technology contact is also statistically significant (MD = -25.60ms; $p <.05$). Therefore, the established significant differences in the duration of the retained /ɛ/ exist among the three levels of technology contact.

4.2.8. Analysis of the pitch and duration difference between stressed and unstressed syllables

Table 4.72: Analysis of variance for the difference between UIYTUs' pitch of *print-* (stressed syllable) and average pitch of *a* and *-out* (unstressed syllables) in *a printout*

Level of technology contact	N	Mean	Std. deviation	
Low	164	24.18	3.25	
Mid	71	30.31	10.28	
High	65	69.58	4.43	
Total	300	35.47	19.08	
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	98419.712	2	49209.856	1408.82	.000
Within Groups	10374.170	297	34.930		
Total	108793.883	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

To instrumentally ascertain any significant difference in UIYTUs' ability to alternate stressed and unstressed syllables for Standard English rhythm using pitch as a correlate of stress, the average pitch values of *a* and -*out* in *a printout* were deducted from the pitch value of *print-*. The analysis of variance for the differences is presented in Table 4.72. the result shows a mean pitch difference of 24.18 Hz for the LTC, 30.31Hz for the MTC and 69.58Hz for the HTC. Total mean pitch value for the 300 participants was 35.47Hz. The result shows a statistically significant difference in UIYTUs' use of pitch prominence to alternate stressed and unstressed syllables [$F_{(2, 297)}$ = 1408.82Hz; $p < .05$].

Table 4.73: Multiple (between-group) comparisons for the difference between UIYTUs' pitch of *print-* (stressed syllable) and average pitch of *a* and *-out* (unstressed syllables) in *a printout*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	-6.13*	.84	.000	-8.20	-4.07
	High	-45.40*	.87	.000	-47.53	-43.27
Mid	Low	6.13*	.84	.000	4.07	8.20
	High	-39.27*	1.02	.000	-41.76	-36.77
High	Low	45.40*	.87	.000	43.27	47.53
	Mid	39.27*	1.02	.000	36.77	41.76

*. The mean difference is significant at the 0.05 level.

The result of multiple comparison for the difference between UIYTUs' pitch of *print-* and average pitch of *a* and *-out* in *a printout*presented in Table 4.73 reveals that UIYTUs with high technology contact had significantly higher pitch difference than UIYTUs with mid technology contact (MD = 39.27Hz; p <.05) and UIYTUs with low technology contact (MD = 45.40Hz; p <.05) for stressed and unstressed syllable alternation. In turn, UIYTUs with mid technology contact (MTC) used pitch to alternate strong and weak syllables significantly better than the LTC (MD = 6.13Hz; p <.05).

Table 4.74: Analysis of variance for the difference between UIYTUs' duration of *print-* (stressed syllable) and average duration of *a* and *-out* (unstressed syllables) in *a printout*

Level of technology contact	**N**	**Mean**	**Std. deviation**		
Low	164	6.64	26.54		
Mid	71	11.68	8.50		
High	65	104.48	30.92		
Total	300	29.01	46.80		
	Sum of squares	**Df**	**Mean square**	**F**	**Sig.**
Between Groups	473842.636	2	236921.318	388.78	.000
Within Groups	180992.573	297	609.403		
Total	654835.209	299			

*significant at 0.05 level; df = 2, 297; critical F. =3.00

Table 4.74 shows the result of analysis of variance for the average duration values of *a* and -*out* in *a printout* deducted from the duration value of *print-*. The mean duration difference for UIYTUs with low technology contact is 6.64ms. The respective mean duration values obtained for UIYTUs with mid technology contact and UIYTUs with high technology contact are 11.68ms and 104.48ms. Total mean duration value for the 300 participants was 29.01ms. The result shows a statistical significant difference in UIYTUs' use of duration to alternate stressed and unstressed syllables [$F_{(2, 297)}$ = 388.78ms; p < .05].

Table 4.75: Multiple (between-group) comparisons for the difference between UIYTUs' duration of *print-* (stressed syllable) and average duration of *a* and *-out* (unstressed syllables) in *a printout*

(I) Level of technology contact	(J) Level of technology contact	Mean difference (I-J)	Std. error	Sig.	95% Confidence interval	
					Lower bound	Upper bound
Low	Mid	-5.08	3.51	.352	-13.71	3.55
	High	-97.87*	3.62	.000	-106.78	-88.97
Mid	Low	5.08	3.51	.352	-3.55	13.71
	High	-92.79*	4.24	.000	-103.22	-82.37
High	Low	97.87*	3.62	.000	88.97	106.78
	Mid	92.79*	4.24	.000	82.37	103.22

*. The mean difference is significant at the 0.05 level.

The result of multiple comparison for the difference between UIYTUs' duration of *print-* and average duration of *a* and *-out* in *a printout* as presented in Table 4.75 reveals that UIYTUs with high technology contact had significantly higher duration difference than UIYTUs with mid technology contact (MD = 92.79ms; $p < .05$) and UIYTUs with low technology contact (MD = 97.87ms; $p < .05$). Although UIYTUs with mid technology contact had higher value for the difference between the duration of *print* and the average duration of *a* and *out* than UIYTUs with low technology contact, the difference is not statistically significant (MD = 5.08ms; $p < .05$).

4.3 Metrical analysis

Having statistically established significant differences in participants' performance for each of the objectives in the previous section, this section concentrates on the metrical theoretical and acoustic analyses of selected utterances. The metrical analysis demonstrates the dominant stress patterns observed in each of the groups using the metrical grid to display the relative prominence of nodes. Predominant metrical patterns in the speeches of the HTC, the MTC and the LTC are compared with that of the native baseline.

4.3.1 Metrical analysis of UIYTUs' polysyllabic word stress

The predominant metrical stress pattern of two polysyllabic words- *conglomerate* and *peculiarity*- observed in the productions of UIYTUs with low technology contact, mid technology contact and high technology contact is presented in this section. The section also presents comparisons of sample spectrographic images of *conglomerate,* as produced by a representative participant of each of the technology contact level,with the native baseline spectrogram for observable differences.

4.3.1.1 Native baseline and representative UIYTUs' metrical grid for *conglomerate* /kənˈglɒmərət/

Native baseline

	*			Wd
	*		*	F
*	*	*	*	Σ
Con	glo	me	rate	
kən	ˈglɒ	mə	rət	

HTC

	*			Wd
	*		*	F
*	*	*	*	Σ
Con	glo	me	rate	
kən	ˈglɒ	mə	rət	

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	*			Wd
	*		*	F
*	*	*	*	σ
Con	glo	me	rate	
kən	ˈglɒ	mə	rət	

UIYTU 130

MTC

*	*	*	*	Wd
*	*	*	*	F
*	*	*	*	Σ
Con	glo	me	rate	
kən	ˈglɒ	mə	rət	

UIYTU 06

*	*	*	*	Wd
*	*	*	*	F
*	*	*	*	σ
Con	glo	me	rate	
kən	ˈglɒ	mə	rət	

UIYTU 90

LTC

*	*	*	*	Wd
*	*	*	*	F
*	*	*	*	Σ
Con	glo	me	rate	
kən	ˈglɒ	mə	rət	

UIYTU 09

*	*	*	*	Wd
*	*	*	*	F
*	*	*	*	σ
Con	glo	Me	rate	
kən	ˈglɒ	mə	rət	

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Predominant stress patterns of the UIYTUs with high, mid and low technology exposure as well as the native baseline metrical grid for *conglomerate* are presented above. The native baseline and the HTC patternsexhibit only one maximally prominent peak by assigning primary stress to -*glo*-, the Designated Terminal Element (DTE) of the stronger foot in adherence to the culminativity principle. At the foot (F) level, *-glo-* and *-rate* were stressed thereby alternating stress while, at the word level, the primary stress of the word was assigned to *-glo-*. This shows the native baseline and the HTC participants' preference for rhythmic patterns where strong and weak syllables are alternated and syllabic strength relativity and hierarchy are displayed. The representative metrical grids for the LTC, more than those of the MTC, predominantly violated the culminativity feature due to the presence of more than one maximally prominent peak. Their speech also manifested a tolerance for adjacent stressed syllables resulting in stress clash as strong foot-level beats were not separated by weak foot-level beats. Syllabic strength relativity and hierarchy was also not obeyed as all syllables were predominantly stressed. The vowels in *con-* and *-me-* which are metrically weak in the rendition of the native baseline and the HTC were predominantly strong in those of the MTC and the LTC.

4.3.1.2 Native baseline and representative UIYTUs' metrical grid for *peculiarity* /pɪˌkju:lɪˈærətɪ/

Native baseline

			*			Wd
	*		*			F
*	*	*	*	*	*	σ
Pe	cu	li	a	Ri	ty	
pɪ	kju:	li	ˈæ	rə	tɪ	

HTC

*			*			Wd
*	*		*			F
*	*	*	*	*	*	Σ
Pe	cu	li	a	ri	ty	
pɪ	kju:	lɪ	ˈæ	rə	tɪ	

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			*			Wd
	*		*			F
*	*	*	*	*	*	σ
Pe	cu	li	a	ri	ty	
pɪ	kju:	lɪ	ˈæ	rə	tɪ	

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MTC

*	*	*	*	*	*	Wd
*	*	*	*	*	*	F
*	*	*	*	*	*	σ
Pe	cu	li	a	ri	ty	
pɪ	kju:	lɪ	ˈæ	rə	tɪ	

UIYTU 71

*	*					Wd
*	*					F
*	*	*	*	*	*	σ
Pe	cu	li	a	ri	ty	
pɪ	kju:	lɪ	ˈæ	rə	tɪ	

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LTC

*	*	*	*	*	*	Wd
*	*	*	*	*	*	F
*	*	*	*	*	*	σ
Pe	cu	li	a	ri	ty	
pɪ	kju:	lɪ	ˈæ	rə	tɪ	

UIYTU 86

*	*	*	*	*	*	Wd
*	*	*	*	*	*	F
*	*	*	*	*	*	σ
Pe	cu	li	a	ri	ty	
pɪ	kju:	lɪ	ˈæ	rə	tɪ	

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From the grid representation of *peculiarity* above, it is observed that the stress patterns of the MTC and the LTC are significantly different from the native baseline as certain syllables other than those stressed by the native baseline participant were stressed in their productions. The LTC predominantly produced all the syllables strong, thereby making their productions devoid of the expected prominence relativity. While a few participants of the mid category produced patterns similar to WSWSWW pattern of the native baseline, majority of them had different patterns- SSWSWW and SSSSSS. Although the patterns observed in the productions of the participants in the high category exhibit, more often than not, similarity with that of the native baseline, there are a good number of deviations. The research participants generally display a tendency to have more prominent syllables than the native baseline in their productions of *peculiarity*. This occurrence, however, decreases as technology exposure increases.

4.3.2 Metrical analysis of UIYTUs' compound nouns and phrase differentiation using stress

The stress pattern of phrasal categories is typically different from that of lexical compounds. Two rules of the metrical theory- the Nuclear Stress Rule (NSR) and the Compound Stress Rule (CSR) therefore apply in this section where the ability of UIYTUs to distinguish between compound words and phrases is examined. This section presents the predominant metrical grid representations of two utterances belonging to different grammatical units (compound nouns and noun phrases), with meanings only distinguishable by stress. The patterns of UIYTUs with high, mid and low technology contact are juxtaposed with those of the native baseline.

4.3.2.1 Native baseline and representative UIYTUs' metrical grid for *blackbird* (compound)/ black bird (noun phrase)

Native baseline				
	*			*
	*	*	*	*
	Blackbird		Black	bird
	ˈblækbɜ:d		blæk	ˈbɜ:d

HTC								
		*		*	*			*
	*	*	*	*	*	*	*	*
	Blackbird		Black	Bird	Blackbird		Black	bird
	ˈblækbɜ:d		blæk	ˈbɜ:d	ˈblækbɜ:d		blæk	ˈbɜ:d
	UIYTU 130				**UIYTU 271**			

MTC		*		*	*	*	*	*
	*	*	*	*	*	*	*	*
	Blackbird		Black	Bird	Blackbird		Black	bird
	ˈblækbɜ:d		blæk	ˈbɜ:d	ˈblækbɜ:d		blæk	ˈbɜ:d
	UIYTU 34				**UIYTU 138**			

LTC	*	*	*	*		*		*
	*	*	*	*	*	*	*	*
	Blackbird		Black	Bird	Blackbird		Black	bird
	ˈblækbɜ:d		blæk	ˈbɜ:d	ˈblækbɜ:d		blæk	ˈbɜ:d
	UIYTU 55				**UIYTU 140**			

In obedience to the Compound Stress Rule for lexical compound and Nuclear Stress Rule for phrasal categories, it is expected that the primary stress of *blackbird*(a particular kind of bird) be assigned to the first syllable, *black-* and that of *black bird*(a bird that is black in colour) be assigned to the second syllable or word, *-bird*as shown in the metrical grid of the native baseline. However, although participants in the HTC category predominantly stressed some syllables more the neighbouring syllables, they mostly applied the Nuclear Stress Rule for both utterances. The productions of the low and mid category participants, against the native baseline, did not reveal the expected stress distinction. Rather, they either preserved the stress pattern of the phrase for both utterances or stressed both syllables of the two utterances.

4.3.2.2 Native baseline and representative UIYTUs' metrical grid for *lightship* (compound)/ *light ship* (noun phrase)

Native baseline	*			*
	*	*	*	*
	Lightship		Light	ˈship
	ˈlaɪtʃɪp		laɪt	ˈʃɪp

HTC	*			*		*		*
	*	*	*	*	*	*	*	*
	Lightship		Light	Ship	Lightship		Light	Ship
	ˈlaɪtʃɪp		laɪt	ˈʃɪp	ˈlaɪtʃɪp		laɪt	ˈʃɪp
	UIYTU 176				**UIYTU 255**			

MTC	*			*	*	*	*	*
	*	*	*	*	*	*	*	*
	Lightship		Light	Ship	Lightship		Light	ship
	ˈlaɪtʃɪp		laɪt	ˈʃɪp	ˈlaɪtʃɪp		laɪt	ˈʃɪp
	UIYTU 114				**UIYTU 215**			

LTC	*	*	*	* *	*	*
	* *	*	*	* *	*	*
	Lightship	Light	Ship	Lightship	Light	ship
	ˈlaɪtʃɪp	laɪt	ˈʃɪp	ˈlaɪtʃɪp	laɪt	ˈʃɪp
	UIYTU 95			**UIYTU 203**		

From the metrical grid of *lightship* and *light ship* above, the stress assignment which occurred in the native baseline production to differentiate between the compound and the phrase such that the SW/WS metrical structure is derived is not demonstrated in the speeches of the LTC and the MTC. Rather, either the WS stress pattern of the phrase is also retained for the compound or the stress was not assigned altogether. The participants of the high technology contact (HTC) category either assign stress to show SW/WS stress distinction between the compound and the phrase or retain the WS stress pattern of the phrase.

4.3.3 Metrical analysis of UIYTUs' nuclear stress assignment

Predominant metrical grid representations of *Ask them to come to the party* and *There could be a bit of rain at the end of the morning*as produced by UIYTUs are presented in this section.

4.3.3.1 Native baseline metrical grid and predominant UIYTUs' pattern for *Ask them to come to the party*

Native baseline							*
	*			*			*
	*	*	*	*	*	*	* *
	Ask	them	to	Come	to	the	party
	æsk	ðəm	tə	kʌm	tə	ðə	pa:tɪ

HTC							*
	*			*			*
	*	*	*	*	*	*	* *
	Ask	them	to	Come	to	the	party
	æsk	ðəm	tə	kʌm	tə	ðə	pa:tɪ

MTC	*			*	*	*	*
	*	*		*	*	*	* *
	*	*	*	*	*	*	* *
	Ask	them	to	Come	to	the	party
	æsk	ðəm	tə	kʌm	tə	ðə	pa:tɪ

LTC	*	*	*	*	*	*	* *
	*	*	*	*	*	*	* *
	*	*	*	*	*	*	* *
	Ask	them	to	come	to	the	party
	æsk	ðəm	tə	kʌm	tə	ðə	pa:tɪ

As noted from the metrical grids above, the native baseline stressed only three syllables and assigned the nuclear stress to the Designated Terminal Element (DTE), *par-*. The participant representing the HTC category had similar pattern as the native baseline by stressing the appropriate syllable of content words- *ask, come* and *par-*, unstressing the function words- *them, to* and *the* and assigning the nuclear stress to *par-*. The speech of the MTC was characterised by a strengthening of some of the grammatical words and syllables in unstressed positions, thereby resulting in a sequence of stressed syllables. The rendition of the participant representing the LTC exhibit a preponderance of stressed syllables as all the syllables were stressed, contrary to the native baseline production.

4.3.3.2 Native baseline metrical grid and UIYTUs' representative pattern for *There could be a bit of rain at the end of the morning*

Native baseline													*
			*		*		*			*			*
	*	*	*	*	*	*	*	*	*	*	*	*	* *
	There	could	be	a	bit	of	rain	at	the	end	of	the	morning
	ðə	kəd	bɪ:	ə	bɪt	əv	reɪn	ət	ðɪ	ɛnd	əv	ðə	mɔ:nɪŋ

HTC													*
			*		*		*			*			*
	*	*	*	*	*	*	*	*	*	*	*	*	* *
	There	could	be	a	bit	of	rain	at	the	end	of	the	morning
	ðə	kəd	bɪ:	ə	bɪt	əv	reɪn	ət	ðɪ	ɛnd	əv	ðə	mɔ:nɪŋ

MTC	*		*	*			*					*	*
	*	*	*	*	*		*			*		*	* *
	*	*	*	*	*	*	*	*	*	*	*	*	* *
	There	could	be	a	bit	of	rain	at	the	end	of	the	morning

ðə	kəd	bɪ:	ə	bɪt	əv	reɪn	ət	ðɪ	ɛnd	əv	ðə	mɔ:nɪŋ

LTC

*	*	*	*	*	*	*	*	*	*			*	*
*	*	*	*	*	*	*	*	*	*	*		*	*
*	*	*	*	*	*	*	*	*	*	*	*	*	*
There	could	be	a	bit	of	rain	at	the	end	of	the	morning	
ðə	kəd	bɪ:	ə	bɪt	əv	reɪn	ət	ðɪ	ɛnd	əv	ðə	mɔ:nɪŋ	

The native baseline produced *There could be a bit of rain at the end of the morning* with five stressed and eight unstressed syllables. The Designated Terminal Element of the strong node, *mor-* received the nuclear stress of the utterance. The HTC predominantly had stress pattern identical with that of the native baseline. The representative participant for the MTC stressed some syllables more than those stressed by the native baseline. The stresses were mainly imposed on function words metrically weakened in the production of the native baseline. The productions of participants representing the LTC was characterised by a preponderance of stressed syllables where more syllables, than in the native baseline production, had more grid placeholders. This denote metrical strength on such syllables. Appropriate assignment of the nuclear stress reduced as technology contact level decreased.

4.3.4 Metrical analysis of UIYTUs' contrastive stress assignment

The nuclear stress of an utterance which, by default, falls on the rightmost stressed syllable in a phrasal structure is sometimes assigned to another syllable within the phrase or clause for contrastive or emphatic purpose. This stress function is tested in the speeches of UIYTUs. Their respective representative stress patterns are presented below:

4.3.4.1 Native baseline and UIYTUs' metrical grid for *That was a GREAT idea*

Native baseline

			*		
			*		*
*	*	*	*	*	*
That	was	a	GREAT	idea	
ðət	wəz	ə	greɪt	aɪdɪə	

HTC *

```
                      *            *
        *     *    *  *           * *
        That  was  a  GREAT       idea
        ðət   wəz  ə  greɪt       aɪdɪə
```

```
MTC                   *
        *             *             *
        *     *    *  *           * *
        That  was  a  GREAT       idea
        ðət   wəz  ə  greɪt       aɪdɪə
```

```
LTC     *     *       *           * *
        *     *    *  *           **
        *     *    *  *           * *
        That  was  a  GREAT       idea
        ðət   wəz  ə  greɪt       aɪdɪə
```

This section presents the native baseline and the representative UIYTUs' metrical patterns for *That was a GREAT idea* where *great,* contrasted with words like *stupid, insignificant* or *ineffective,* receives the nuclear stress of the expression. As expected, the native baseline stressed *great* more than any other syllable for contrast. The representative participant of the HTC had stress pattern similar to that of the native baseline and reassigned the nuclear stress to *great,* the contrastive DTE. The stress pattern of the MTC is also identical with the native baseline's (except for a few extra stressed syllables) and expectedly reassigned stress to contrast the focused word. Participants in the LTC category predominantly stressed more syllables than the native baseline. The expected emphasis on *great* also did not feature in their speech.

4.3.4.2 Native baseline metrical grid and representative UIYTUs' pattern for *She WAS my friend*

```
Native baseline   *
                  *          *
            *     *     *    *
            She   WAS   my   friend
            ʃɪ    wɒz   mə   frend
```

```
HTC               *
                  *          *
            *     *     *    *
            She   WAS   my   friend
```

ʃɪ wɒz mə frend

MTC

```
         *
         *         *
    *    *    *    *
    She  WAS  my   friend
    ʃɪ   wɒz  mə   frend
```

LTC

```
         *
         *         *
    *    *    *    *
    She  WAS  my   Friend
    ʃɪ   wɒz  mə   Frend
```

For *She WAS my friend*, the native baseline and the representative participant of the HTC produced WSWS metrical structure and assigned the nuclear stress of the utterance to *was*, a grammatical word which ordinarily would have been metrically weak, in order to focus attention on it. Contrary to usual nuclear stress assignment, the MTC mainly assigned the nuclear stress to *was* in order to contrast it with *is.* The LTC category produced more stressed syllable than weak ones for the expression. Also, nuclear stress was neither assigned to *friend*, the regular nuclear stress position, nor to *was*, the focused word.

4.3.5 Metrical analysis of UIYTUs' vowel reduction

Vowels in metrically weak positions of English content words, grammatical words and words with syllabic consonants as their peak were examined in the speeches of University of Ibadan Yoruba teenage undergraduates. The predominant metrical (grid) patterns found in the productions of the UIYTUs are juxtaposed with the native baseline's below.

4.3.5.1 Native baseline and representative UIYTUs' metrical grid for *tomorrow*

Native Baseline

```
          *
          *     *
    *     *     *
    To    mor   row
    tə    mɔ:   rəʊ
```

HTC *   *

		*	*		*	*
	*	*	*	*	*	*
	To	mor	row	To	mor	row
	tə	mɔ:	rəʊ	tə	mɔ:	rəʊ
	UIYTU 08			**UIYTU 99**		
MTC	*	*	*		*	
	*	*	*		*	*
	*	*	*	*	*	*
	To	mor	row	To	mor	row
	tə	mɔ:	rəʊ	tə	mɔ:	rəʊ
	UIYTU 13			**UIYTU 140**		
LTC	*	*	*	*	*	*
	*	*	*	*	*	*
	*	*	*	*	*	*
	To	mor	row	To	mor	row
	tə	mɔ:	rəʊ	tə	mɔ:	rəʊ
	UIYTU 03			**UIYTU 86**		

The native baseline and its approximate HTC productions exhibited only one maximally prominent peak -*mor*-. They also showed a preference for rhythmic patterns where strong and weak syllables are alternated and displayed syllabic strength relativity and hierarchy to achieve the WSW metrical pattern of the word. Thus the vowel /ʊ/ in the unstressed syllable *to*- is reduced to /ə/. The productions of the LTC and the MTC, however, predominantly violated the culminativity feature. Their speech also manifested a tolerance for adjacent stressed syllables resulting in stress clash as the strong foot-level beats were not separated by weak ones. Syllabic strength relativity and hierarchy was also not obeyed as all syllables (vowels) were produced strong, thereby making their productions devoid of the expected strong/weak vowel distinction.

4.3.5.2 Native baseline and representative UIYTUs' metrical grid for *support*

Native baseline		*
	*	*
	Su	pport
	sə	pɔ:t

HTC		*		*
	*	*	*	*
	Su	pport	Su	pport
	sə	pɔ:t	sə	pɔ:t
	UIYTU 145		**UIYTU 264**	

MTC		*		*	*
	*	*		*	*
	Su	pport		Su	pport
	sə	pɔ:t		sə	pɔ:t
	UIYTU 142			**UIYTU 233**	
LTC	*	*		*	*
	*	*		*	*
	Su	pport		Su	pport
	sə	pɔ:t		sə	pɔ:t
	UIYTU 158			**UIYTU 296**	

The metrical grid of *support* as produced by the representative participants of the various categories of technology contact featured both similarities with and departure from the native baseline production such that the expected /ʌ/ to /ə/ vowel reduction in the first syllable is realised in some cases whereas, in others, the vowel is retained in its strong form. While the HTC largely produced WS stress pattern similar to the native baseline, the MTC produced either WS (where the vowel was reduced) or SS pattern (where reduction did not occur). Again the SS pattern was predominantly found in the productions of the LTC represented by UIYTU 158 and UIYTU 296.

4.3.5.3 Native baseline and representative UIYTUs' metrical grid for *The children's conduct during the concert was excellent*

Native baseline								*
		*	*	*		*		*
	*	* *	* *	* *	*	* *	*	* * *
	The	children's	conduct	during	the	concert	**was**	excellent
	ðə	ˈʧɪldrənz	ˈkɒndʌkt	ˈdjʊərɪŋ	ðə	ˈkɒnsət	**wəz**	ˈɛksələnt

HTC								*
		*	*	*		*		*
	*	* *	* *	* *	*	* *	*	* * *
	The	children's	conduct	during	the	concert	**was**	excellent
	ðə	ˈʧɪldrənz	ˈkɒndʌkt	ˈdjʊərɪŋ	ðə	ˈkɒnsət	**wəz**	ˈɛksələnt

MTC		*	* *					*
	*	*	* *	*		*		*
	*	* *	* *	* *	*	* *	*	* * *
	The	children's	conduct	during	the	concert	**was**	excellent
	ðə	ˈʧɪldrənz	ˈkɒndʌkt	ˈdjʊərɪŋ	ðə	ˈkɒnsət	**wəz**	ˈ ɛksələnt

LTC	*	* *	* *	* *	*	* *	*	* * *

*	* *	* *	* *	*	* *	*	* * *
*	* *	* *	* *	*	* *	*	* * *
The	children's	conduct	during	the	concert	**was**	excellent
ðə	ˈʧɪldrənz	ˈkɒndʌkt	ˈdjʊərɪŋ	ðə	ˈkɒnsət	**wəz**	ˈɛksələnt

From the grid representation and the stress pattern of *The children's conduct during the concert was excellent* with focus on *the* and *was* above, The HTC predominantly unstressed the determiner *the* /ðə/ and auxiliary verb *was /wəz/* thereby approximating to the native baseline where stressed syllables were spaced apart at regular intervals resulting in rhythmic alternation. The MTC predominantly reduced vowel /ɒ/ in the auxiliary verb *was* to the schwa, /ə/ while the expected reduction in the determiner mostly did not occur. Weak forms of both grammatical words were minimally realised in the speeches of the LTC. Since stress was predominantly assigned to grammatical words, the productions of the LTC and the MTC exhibit varying degrees of non-conformity to SBE rhythm.

4.3.5.4 Native baseline and representative UIYTUs' metrical grid for *threaten*

Native baseline

*	
*	*
Threa	ten
θrɛ	tn̩

HTC

*			*	
*	*		*	*
Threa	ten		Threa	ten
θre	tn̩		θre	tn̩
UIYTU 156			**UIYTU 266**	

MTC

*			*	
*	*		*	*
Threa	ten		Threa	Ten
θrɛ	tn̩		θrɛ	tn̩
UIYTU 11			**UIYTU 129**	

LTC

*			*	*
*	*		*	*
Threa	ten		Threa	ten
θrɛ	tn̩		θrɛ	tn̩
UIYTU 19			**UIYTU 112**	

Syllabic consonants /n̩/ which replaced the elided vowel in *-ten /-tn̩/* in the native baseline production was tested as nucleus of the weak syllable in the production of UIYTUs. The LTC mainly strengthened the syllable by inserting vowel /ɪ/ between /t/ and /n/ while the MTC and the HTC participants largely approximated to the native baseline.

4.3.5.5 Native baseline and representative UIYTUs' metrical grid for *couple*

Native baseline	*	
	*	*
	Cou	ple
	kʌ	pl̩

HTC	*		*	
	*	*	*	*
	Cou	ple	Cou	ple
	kʌ	pl̩	kʌ	pl̩
	UIYTU 99		**UIYTU 201**	
MTC	*	*	*	*
	*	*	*	*
	Cou	ple	Cou	ple
	kʌ	pl̩	kʌ	pl̩
	UIYTU 71		**UIYTU 209**	
LTC	*	*	*	*
	*	*	*	*
	Cou	ple	Cou	ple
	kʌ	pl̩	kʌ	pl̩
	UIYTU 86		**UIYTU 193**	

The metrical grid for *couple* shows that the native baseline had SW structure with the vowel in the W node completely elided and replaced with /l̩/. In similar fashion, representative participants for the HTC predominantly produced SW pattern by making the syllabic lateral consonant /l̩/ the peak of -*ple*, thereby approximating to the native baseline. Majority of the participants in the MTC category represented by UIYTU 71 and UIYTU 209 did not, as expected of them, elide the vowel thereby featuring vowel /ʊ/insertion or outright substitution of the syllabic consonant with /ʊ/.Participants representing the LTC had SS pattern. Rather than produce /l̩/ as the head of the weak node as found in the native baseline production, they predominantly substituted with /ʊ/, a strong vowel.

4.3.6 Metrical analysis of UIYTUs' stress shift

To further verify the rejection of hypothesis 6 in the statistical analysis section, selected lexical items aimed at testing UIYTUs' ability to shift stress was examined in words with stress-shifting suffixes, variable words and phrases with iambic-feet modifier followed by stressed syllables, as produced by the UIYTUs, were analysed using metrical grids and acoustic instruments. For each of the categories, predominant metrical patterns of selected words/expressions are presented below.

4.3.6.1 Native baseline and representative UIYTUs metrical grid for stress shift in*photo→photography*

Native baseline

```
                     *
*                    *         *
*     *         *    *    *    *
Pho   to   →    Pho  to   gra  phy
ˈfəʊ  təʊ       fə   ˈtɒ  grə  fɪ
```

HTC

```
                     *                              *     *           *
*                    *           *        *         *     *     *     *
*     *         *    *     *     *        *     *   *     *     *     *
Pho   to   →    Pho  to    gra   phy      Pho   to  →  Pho  to    gra   phy
ˈfəʊ  təʊ       fə   ˈtɒ   grə   fɪ       ˈfəʊ  təʊ    fə   ˈtɒ   grə   fɪ
UIYTU 106                                 UIYTU 191
```

MTC

```
                *    *     *                             *     *           *
*               *    *     *              *              *     *     *     *
*     *         *    *     *     *        *     *        *     *     *     *
Pho   to   →    Pho  to    gra   phy      Pho   to  →    Pho   to    gra   phy
ˈfəʊ  təʊ       fə   ˈtɒ   grə   fɪ       ˈfəʊ  təʊ      fə    ˈtɒ   grə   fɪ
UIYTU 78                                  UIYTU209
```

LTC

```
                *    *     *     *                       *     *     *     *
*               *    *     *     *        *              *     *     *     *
*     *         *    *     *     *        *     *        *     *     *     *
Pho   to   →    Pho  to    gra   phy      Pho   to  →    Pho   to    gra   phy
ˈfəʊ  təʊ       fə   ˈtɒ   grə   fɪ       ˈfəʊ  təʊ      fə    ˈtɒ   grə   fɪ
UIYTU 89                                  UIYTU 173
```

Addition of suffixes to simple words is a morphological change capable of influencing or determining stress placement within the words depending on whether it draws the stress on itself; leaves the stress pattern of the stem unaltered or shifts the stress to another syllable. The metrical grids above show how this morphological process interact with word stress in the speeches of

UIYTUs with various levels of technology contact. As presented in the grids, All the representative participants of the three categories of technology contact produced the SW structure as seen in the native baseline production for *photo* /ˈfəʊtəʊ/, probably because the weaker node contains a vowel that is not prone to reduction. Their productions however differ with suffixation which prompts a forward shift of the primary stress from *pho-* to *-to-*, thereby reducing the strong vowel in the former to /ə/. Representative participants for the LTC and the MTC did not shift stress as expected. Their productions were rather characterised by sequence of stressed syllables where structures as SSWS, SSSS or SSSW were produced. The production of the HTC featured both expected stress shift and stress clashes as demonstrated in the productions of UIYTU 106 and UIYTU 191 respectively.

4.3.6.2 Native baseline and representative UIYTUs' metrical grid for stress shift in *perfect→perfection*

```
Native baseline   *                   *
                  *     *       *     *     *
                  Per   fect →  Per   fec   tion
                  pɜ:   fɪkt    pə    fɛk   ʃən

HTC  *                  *                 *                  *
     *     *       *    *     *           *     *       *    *     *
     Per   fect →  Per  fec   tion        Per   fect →  Per  fec   tion
     pɜ:   fɪkt    pə   fɛk   ʃən         pɜ:   fɪkt    pə   fɛk   ʃən
     UIYTU 133                            UIYTU 263

MTC  *     *       *    *     *           *                  *
     *     *       *    *     *           *     *       *    *     *
     Per   fect →  Per  fec   tion        Per   fect →  per  fec   tion
     pɜ:   fɪkt    pə   fɛk   ʃən         pɜ:   fɪkt    pə   fɛk   ʃən
     UIYTU 116                            UIYTU 232

LTC  *     *       *    *     *           *                  *
     *     *       *    *     *           *     *       *    *     *
     Per   fect →  Per  fec   tion        Per   fect →  Per  fec   tion
     pɜ:   fɪkt    pə   fɛk   ʃən         pɜ:   fɪkt    pə   fɛk   ʃən
     UIYTU 126                            UIYTU 196
```

As presented in the grids above, the productions of UIYTUs differ with the *-ion* stress-shifting suffix which prompts a forward shift of the primary stress from *per-* to *-fec-*, thereby reducing /ɜ:/ in *per* to /ə/. Again, the closest correspondence between the level of technology contact and ability to shift stress as required is found among the HTC as demonstrated in the metrical grids of the two representative participants in this category. While some of the representative participants of the LTC and the MTC produced SW structure similar to the native baseline production for *perfect*, others produced SS pattern. In the same vein, the expected stress shift was realised in the productions of some of the participants in these categories represented by UIYTU 196 and UIYTU 232, while in others, represented by UIYTU 126 and UIYTU 116, stress was not shifted.

4.3.6.3 Native baseline and representative UIYTUs' metrical grid for stress shift in *conduct* (noun) and *conduct* (verb)

Native baseline	*				*
	*	*		*	*
	Con	duct	→	Con	duct
	ˈkɒn	dʌkt		kən	ˈdʌkt

HTC	*				*	*	*		*	*
	*	*		*	*	*	*		*	*
	Con	Duct	→	Con	duct	Con	duct	→	Con	duct
	ˈkɒn	dʌkt		kən	ˈdʌkt	ˈkɒn	dʌkt		kən	ˈdʌkt
	UIYTU 102					**UIYTU 163**				
MTC	*	*		*	*	*	*		*	*
	*	*		*	*	*	*		*	*
	Con	duct	→	Con	duct	Con	duct	→	Con	duct
	ˈkɒn	dʌkt		kɒn	ˈdʌkt	ˈkɒn	dʌkt		kən	ˈdʌkt
	UIYTU 79					**UIYTU 146**				
LTC	*	*		*	*	*	*		*	*
	*	*		*	*	*	*		*	*
	Con	duct	→	Con	duct	Con	duct	→	Con	duct
	ˈkɒn	dʌkt		kən	ˈdʌkt	ˈkɒn	dʌkt		kən	ˈdʌkt
	UIYTU 55					**UIYTU 140**				

The metrical grids above present the noun/verb stress distinction for *conduct.* The stress pattern of the representative participants of the LTC and the MTC shows large variance from the native baseline SW (noun) and WS (verb) patterns. Whereas the vowel in the weak position, particularly of the verb, is reduced to /ə/ in the native baseline production, it predominantly remains stressed in the LTC and the MTC production of the words. All the representative participants of the LTC and the MTC had SS pattern for both noun and verb forms. While many of the HTC represented by UIYTU 102 produced SW pattern of *conduct* (Noun)and WS pattern of the verb identical with that of the native baseline, many others represented by UIYTU 163 produced SS patterns thereby deviating from the standard form.

4.3.6.4 Native baseline metrical grid and representative UIYTUs' pattern for *she was thirteen yesterday*

Native baseline — **Pre-stress-shift metrical grid** → **Post-stress-shift metrical grid**

```
                          *                                   *
                      *   *                          *        *
*     *     *     *   *  *  *          *     *     *    *   *  *  *
She   Was   thirteen  yesterday   →    She   was   thirteen yesterday
ʃɪ    Wəz   θɜ:tɪ:n   jestədɪ          ʃɪ    wəz   θɜ:tɪ:n  jestədɪ
```

HTC (UIYTU 24) — **Pre-stress-shift metrical grid** → **Post-stress-shift metrical grid**

```
                          *                                   *
                      *   *                               *   *
*     *     *     *   *  *  *          *     *     *    *   *  *  *
She   Was   thirteen  yesterday   →    She   was   thirteen yesterday
ʃɪ    Wəz   θɜ:tɪ:n   jestədɪ          ʃɪ    wəz   θɜ:tɪ:n  jestədɪ
```

MTC (UIYTU 53) — **Pre-stress-shift metrical grid** → **Post-stress-shift metrical grid**

```
      *               *   *                  *            *   *
      *     *         *   *                  *     *      *   *
*     *     *     *   *  *  *          *     *     *    *   *  *  *
She   Was   thirteen  yesterday   →    She   was   thirteen yesterday
ʃɪ    Wəz   θɜ:tɪ:n   jestədɪ          ʃɪ    wəz   θɜ:tɪ:n  jestədɪ
```

LTC (UIYTU 89) — **Pre-stress-shift metrical grid** → **Post-stress-shift metrical grid**

```
      *     *         *   *                  *     *      *   *
      *     *         *   *     *            *     *      *   *     *
*     *     *     *   *  *  *          *     *     *    *   *  *  *
She   Was   thirteen  yesterday   →    She   was   thirteen yesterday
ʃɪ    Wəz   θɜ:tɪ:n   jestədɪ          ʃɪ    wəz   θɜ:tɪ:n  jestədɪ
```

The pre-stress-shift metrical grid of *She was thirteen yesterday* shows a case in which relative prominence and the isochronous rhythm are not preserved as a result of the two adjacent stressed syllables at the foot level: *-teen* and *yes-*. The desire to maintain an alternating pattern in the native baseline production therefore prompts a backward shift of stress as presented in the post-stress-shift metrical grid of the native baseline where the stress on *-teen* is shifted to *thir-*. Majority of the participants of the LTC and the MTC did not only fail to resolve the stress clash as done by the NB. They also had more stressed syllables, even in positions where weak syllables were found in the NB production. Instead of altering the stress pattern of *thirteen* in the pronominal position to allow for an intervening weak syllable between the clashing syllables, their production of *thirteen* was same as in isolation where *-teen* remained stressed. Although majority the participants in the high category produced similar pattern as the NB for *She was thirteen,* there were more cases of unresolved stress clash between *-teen* and *yes-* than cases of stress shift.

4.3.7 Metrical analysis for UIYTUs' segmental elision

4.3.7.1 Native baseline and representative UIYTUs' metrical grid for*strawberry*

Native baseline	*		
	*		*
	*	*	*
	Straw	ber	ry
	strɔ:	b(ə)	rɪ

HTC	*			*		
	*		*	*		*
	*	*	*	*	*	*
	Straw	ber	ry	Straw	ber	ry
	strɔ:	b(ə)	rɪ	strɔ:	b(ə)	rɪ
	UIYTU 99			**UIYTU 186**		
MTC	*			*	*	*
	*		*	*	*	*
	*	*	*	*	*	*
	Straw	ber	ry	Straw	ber	ry
	strɔ:	b(ə)	rɪ	strɔ:	b(ə)	rɪ
	UIYTU 110			**UIYTU 146**		
LTC	*			*	*	*
	*		*	*	*	*
	*	*	*	*	*	*
	Straw	ber	ry	Straw	ber	ry
	strɔ:	b(ə)	rɪ	strɔ:	b(ə)	rɪ
	UIYTU 67			**UIYTU 155**		

The native baseline production of *strawberry* presents a metrical pattern SWW where the medial syllable is not only weak but has its nucleus realised as null. The expected vowel elision is preponderant in the productions of the University of Ibadan Yoruba teenage undergraduates with high technology contact (HTC) as both representative participants in this category elided the vowel. The productions of the MTC and the LTC feature both elision (as shown in the representative metrical grids of UIYTU 110 and UIYTU 67 respectively) and retention of the vowel as the supposedly elided vowel was predominantly realised quantitatively in the productions of the other participants in both categories, represented by UIYTU 155 and UIYTU 146.

4.3.8 Metrical analysis for UIYTUs' stressed and unstressed syllable alternation

It has earlier been established statistically that UIYTUs' approximation to the Standard English isochrony, achieved by alternating stressed and unstressed syllables, decreased as technology contact level decreased and vice versa. To further verify this, the predominant metrical patterns found in UIYTUs' production of *congratulations* and *a printout* are displayed and discussed in sections 4.3.8.1 and 4.3.8.2.

4.3.8.1 Native baseline metrical grid and representative UIYTUs' patterns for *congratulations*

Native baseline

```
                    *
          *         *
     *    *    *    *    *
     Con  Gra  tu   La   tions
     kən  Græ  ʧə   leɪ  ʃənz
```

HTC

```
                    *                                   *
          *         *                         *         *
     *    *    *    *    *               *    *    *    *    *
     Con  gra  tu   La   tions           Con  gra  tu   la   tions
     kən  græ  ʧə   leɪ  ʃənz            kən  græ  ʧə   leɪ  ʃənz
     UIYTU 106                           UIYTU 245
```

MTC

```
                    *                    *    *    *    *    *
          *         *                    *    *    *    *    *
     *    *    *    *    *               *    *    *    *    *
     Con  gra  tu   La   tions           Con  gra  tu   la   tions
     kən  græ  ʧə   leɪ  ʃənz            kən  græ  ʧə   leɪ  ʃənz
     UIYTU 78                            UIYTU 116
```

LTC	*	*	*	*	*	*	*	*	*	*
	*	*	*	*	*	*	*	*	*	*
	*	*	*	*	*	*	*	*	*	*
	Con	gra	tu	La	tions	Con	gra	tu	la	tions
	kən	græ	ʧə	leɪ	ʃənz	kən	græ	ʧə	leɪ	ʃənz
	UIYTU 112					**UIYTU 196**				

The native baseline production for *congratulations* features, at the foot level, two stressed syllable: -gra- and -la-, the respective Designated Terminal Element (DTE) of the weaker and stronger nodes. The main stress was assigned to -la-, the DTE of the stronger node at the word level. All other syllables in the word were unstressed, thus the WSWSW pattern. The representative participants of the HTC (UIYTU 106 and UIYTU 245) predominantly produced similar patterns as the native baseline's. In place of alternation, contiguous strong syllables characterised the productions of the LTC. This group mainly stressed all the syllables of the word. The productions of the MTC predominantly featured both alternation of stressed and unstressed syllables and stress clashes.

4.3.8.2 Native baseline metrical grid and representative UIYTUs' patterns for *a printout*

Native baseline		*				
	*	*	*			
	A	Print	out			
	ə	ˈprɪnt	ˌaʊt			
HTC		*				*
	*	*	*	*	*	*
	A	Print	out	A	print	out
	ə	ˈprɪnt	ˌaʊt	ə	ˈprɪnt	ˌaʊt
	UIYTU 156			**UIYTU 245**		
MTC			*		*	*
	*	*	*	*	*	*
	A	Print	out	A	print	out
	ə	ˈprɪnt	ˌaʊt	ə	ˈprɪnt	ˌaʊt
	UIYTU 110			**UIYTU 209**		
LTC	*	*	*	*	*	*
	*	*	*	*	*	*
	A	Print	out	A	print	out
	ə	ˈprɪnt	ˌaʊt	ə	ˈprɪnt	ˌaʊt

UIYTU 173 UIYTU 258

The head of the nominal phrase (NP) *a printout* is a lexical compound on which the Compound Stress Rule (CSR) applies. It is, therefore, expected that the nuclear stress of the NP be assigned to the initial element of the compound *print-*. The native baseline production typically assigns the nuclear stress of the utterance to *print-,* thereby producing WSW pattern. Majority of the participants of the MTC and the LTC categories (all the representative participants of each group) not only produced *-out* with more prominence than the deserving syllable, thereby substituting the pattern of the compound with that of a phrase (*print out*), their productions also featured contiguous strong syllables. While some participants of the HTC represented by UIYTU 156 produced WSW pattern as the native baseline, others represented by UIYTU 245 produced WWS pattern.

4.4 Acoustic analysis

The acoustic analysis is based on spectrographic description of the regular patterns realised in the speeches of UIYTUs to show the pitch prominence and duration of strong syllables relative to the pitch prominence and duration of the weak ones in selected words or expressions. A sample representative spectrogram of each of the technology contact level is compared with the baseline's spectrographic images for observable differences.

4.4.1 Dominant spectrographic patterns of *conglomerate* as produced by the native baseline and the UIYTUs

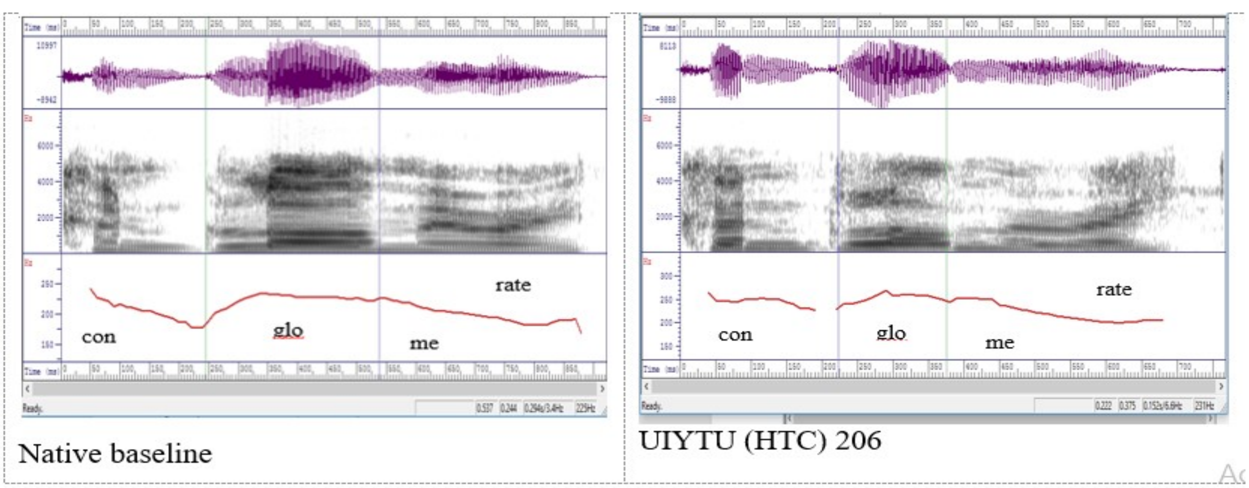
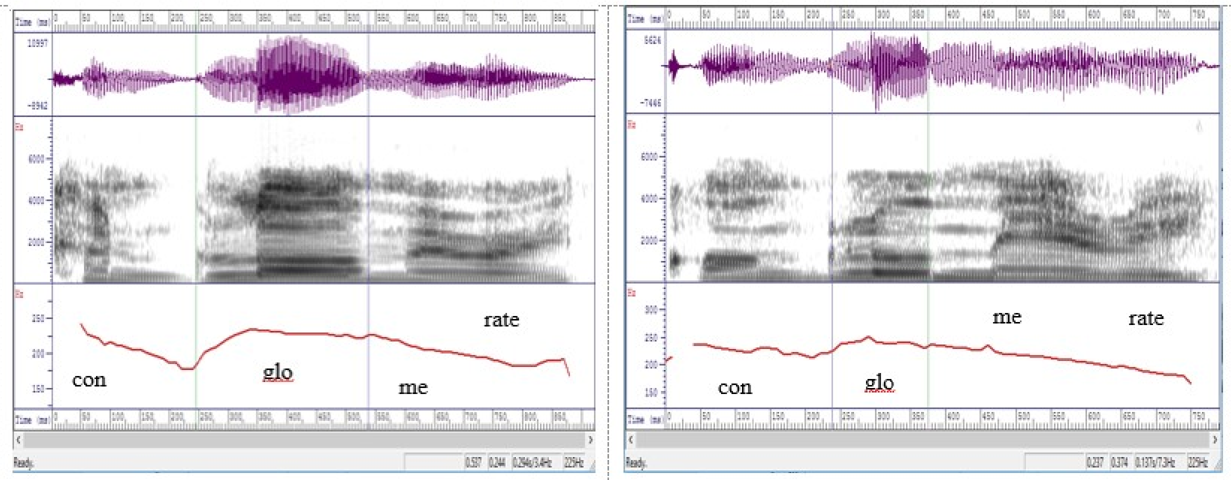


Figure 4.21: Native baseline spectrogram of *conglomerate* compared with sample HTC spectrogram of *conglomerate* as produced by UIYTU 206

Figure 4.21 above shows the spectrograms of *conglomerate* as produced by the native baseline and a sample of the dominant pattern realised in the rendition of the HTC. The NB spectrogram shows that -*glo*- was produced at the highest pitch than any other syllable of the word (239Hz) and the duration was distinctively longer than the other syllables (244ms). Similarly, the HTC spectrogram shows a modulation of pitch between the stressed syllable and the weak ones. The stressed syllables were also produced with longer duration than the weak ones. The pitch (258 Hz) and the duration (375ms) of the primarily stressed syllable is higher and longer respectively than those of the other syllables.

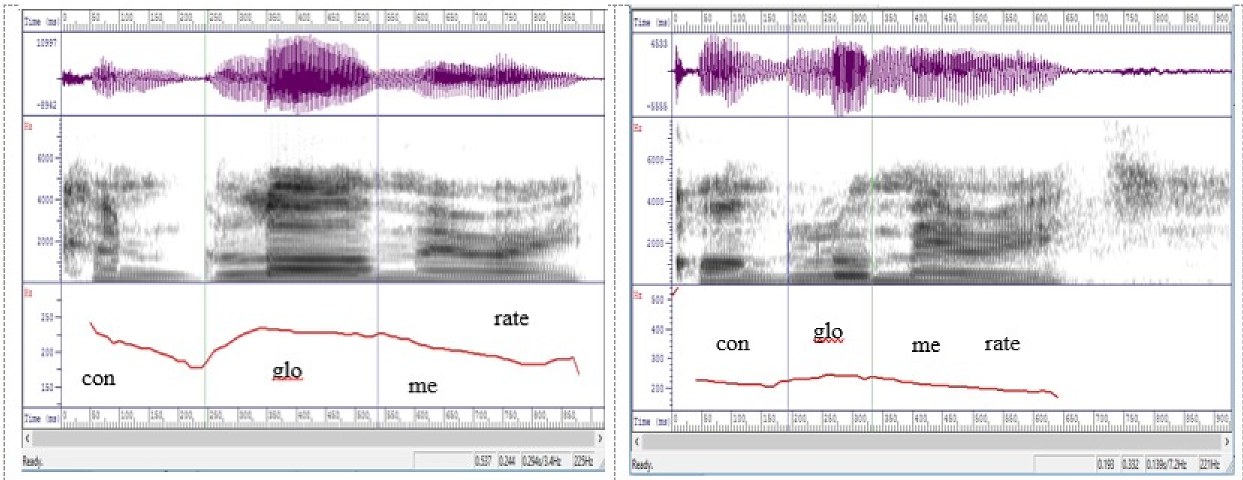


Native baseline

UIYTU (MTC) 84

Figure 4.22: Spectrogram of *conglomerate* as produced by the native baseline compared with sample MTC spectrogram of *conglomerate* as produced by UIYTU (MTC) 84

The spectrograms of *conglomerate* as produced by the native baseline and a sample of the dominant pattern realised in the production of the MTC are shown in Figure 4.22. In comparison with the NB spectrogram which shows that -*glo*- was produced at the highest pitch (239Hz) and that the duration was distinctively longer than the other syllables (244ms), the MTC spectrogram shows a slightly higher pitch on -*glo*- than the other syllables (246Hz). The expected durational distinction between the stressed and the unstressed syllables is, however, not evident on the spectrogram.



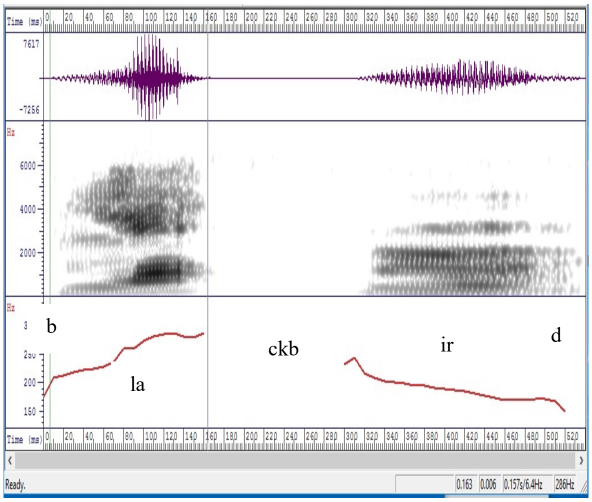
Native baseline

UIYTU (LTC) 37

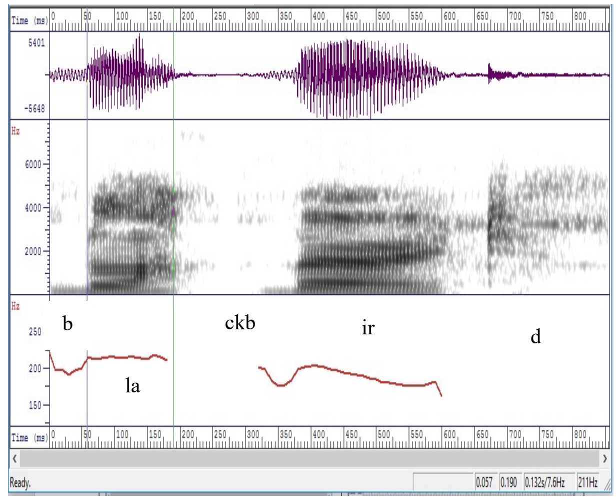
Figure 4.23: Spectrogram of *conglomerate* as produced by the native baseline compared with sample LTC spectrogram of *conglomerate* as produced by UIYTU (LTC) 37

The spectrograms of *conglomerate* as produced by the native baseline and a sample of the dominant pattern realised in the production of the LTC are shown in Figure 4.23. While the NB spectrogram shows pitch and durational contrast between the stressed syllable and the unstressed ones, the fundamental frequency track of the LTC spectrogram does not show the expected variation in pitch. The syllables of *conglomerate* are also produced with equivalent duration.

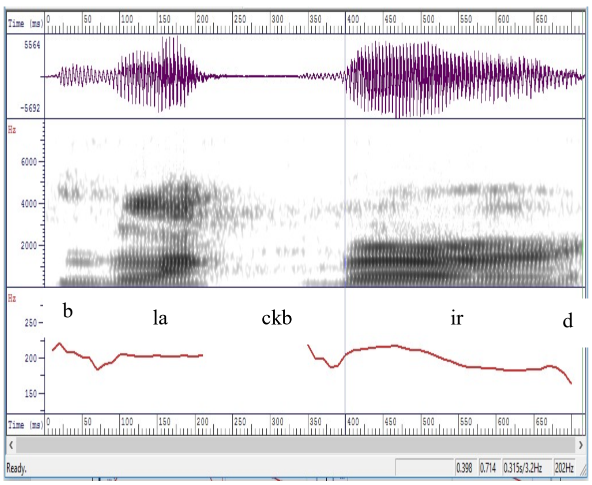
4.4.2 Dominant spectrographic patterns of *blackbird/black bird* as produced by the native baseline and the UIYTUs



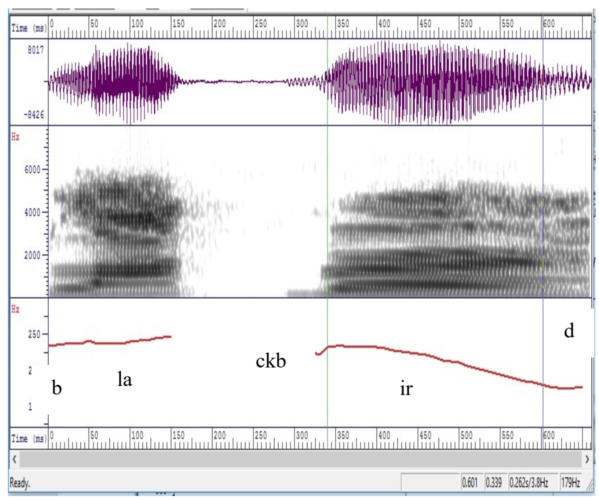
Native baseline: Blackbird



HTC: Blackbird



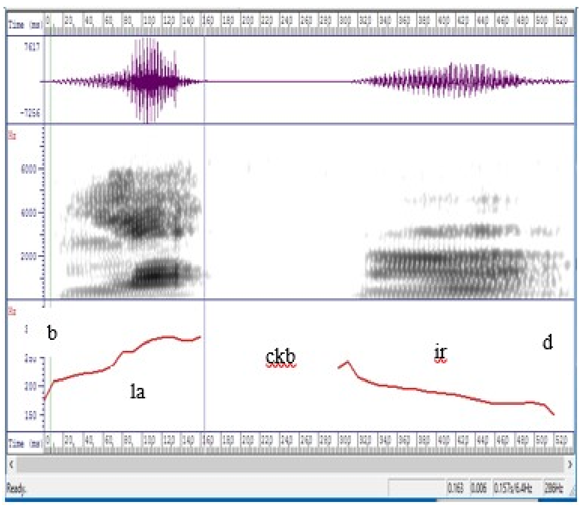
Native baseline: Black bird



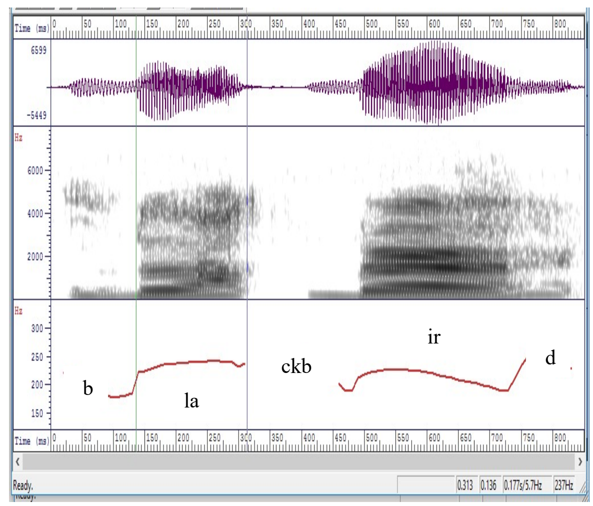
HTC: Black bird

Figure 4.24: Spectrograms of *blackbird*/*black bird* as produced by the native baseline compared with sample HTC spectrograms of *blackbird*/*black bird* as produced by UIYTU 271

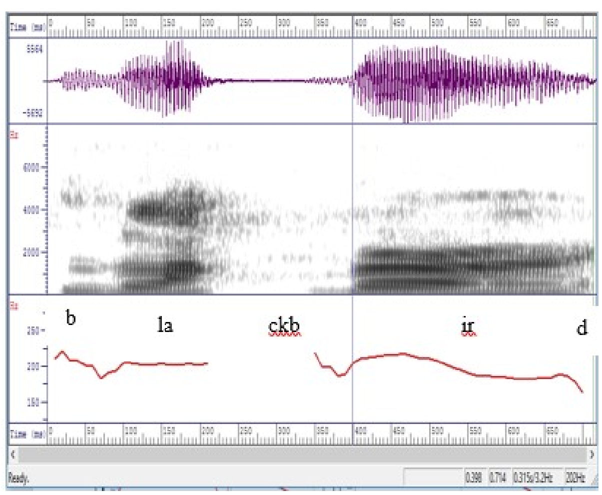
The spectrographic images of *blackbird* (compound noun)/*black bird* (noun phrase) as produced by the native baseline in comparison with a sample HTC spectrographic images of the same expressions as produced by UIYTU 271 are displayed in Figure 4.24. The pitch contour of the NB *blackbird* spectrogram shows a higher pitch on the initial syllable, produced at 286Hz, than the final syllable which was produced at 218Hz. The stress is reversed in *black bird* as the pitch track shows a higher amplitude on the latter syllable at 217Hz than the initial syllable produced at 201Hz. The duration of *bird* was longer than that of *black* in both expressions. The HTC acoustic image of *blackbird* and *black bird* both show higher pitch prominence on *black* than on *bird* for both expressions. For the initial expression, *black-* had a pitch reading of 201Hz against the 194Hz reading of *-bird.* In the phrasal structure, *black* was produced at a pitch of 207Hz against the 179Hz of *bird.* This shows that the participant mainly retained one stress pattern for both expressions. The duration of *-bird* was longer than that of *black-* for both.



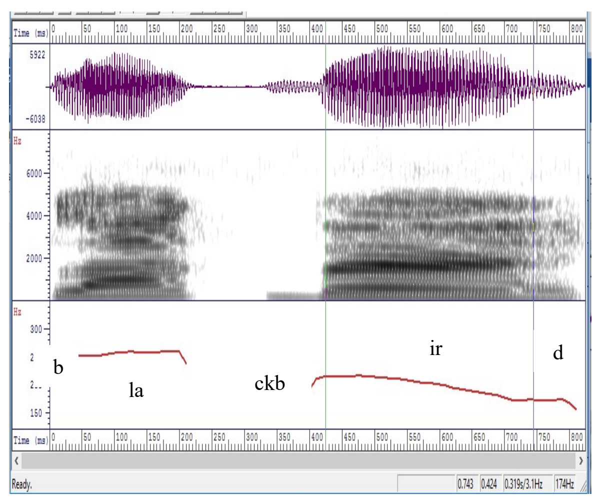
Native baseline: Blackbird



MTC: Blackbird



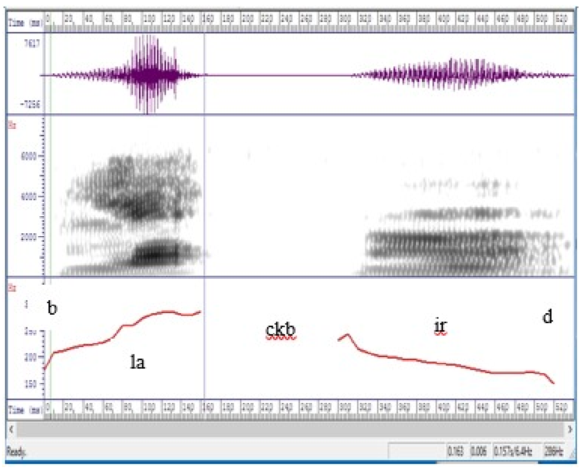
Native baseline: Black bird



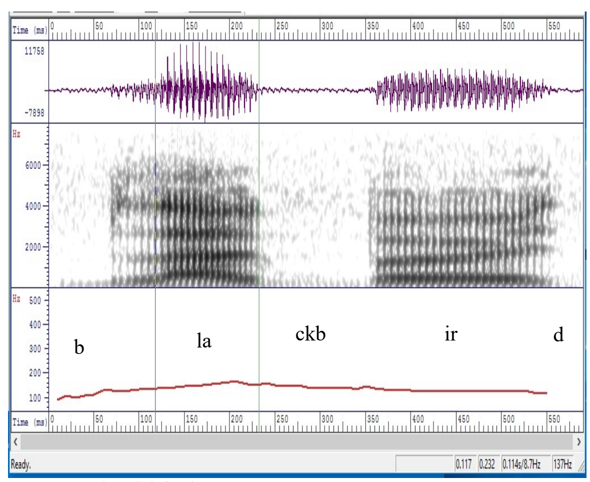
MTC: Black bird

Figure 4.25: Spectrographic images of *blackbird/black bird* as produced by the native baseline compared with sample MTC spectrographic images of *blackbird/black bird* as produced by UIYTU (MTC) 294

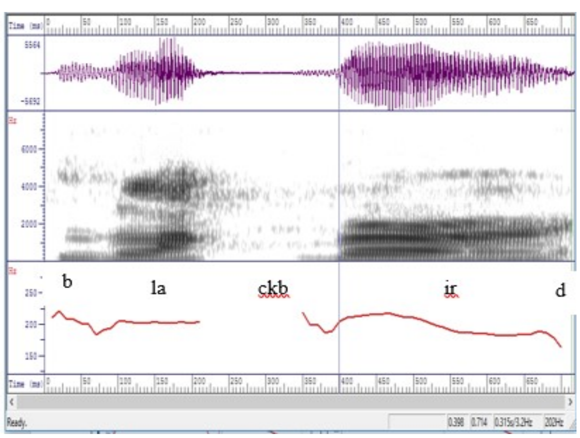
Figure 4.25 shows the spectrograms of *blackbird* (compound noun)/*black bird* (noun phrase) as produced by the native baseline compared with a sample MTC spectrographic images of the same expressions as produced by UIYTU 294. In comparison with the NB spectrogram already analysed above, the MTC spectrogram of *blackbird* virtually shows no modulation of pitch between the two syllables as *black-* was produced at 237Hz against the 233Hz pitch of *-bird.* and *black bird* both show higher pitch prominence on *black* than on *bird* for both expressions. The pitch contour of the phrasal structure, however, shows that *black* was produced at a higher pitch of 243Hz against the 174Hz of *bird.* This shows that the MTC assigned stress appropriately in the phrase but could not in the compound noun. The duration of *bird* was longer the duration of *black* for both expressions.



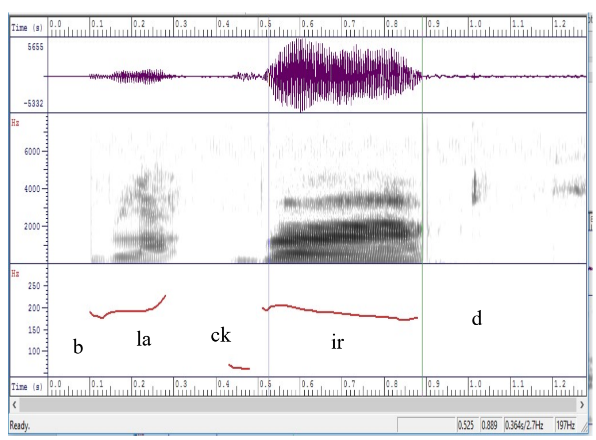
Native baseline: Blackbird



LTC: Blackbird



Native baseline: Black bird

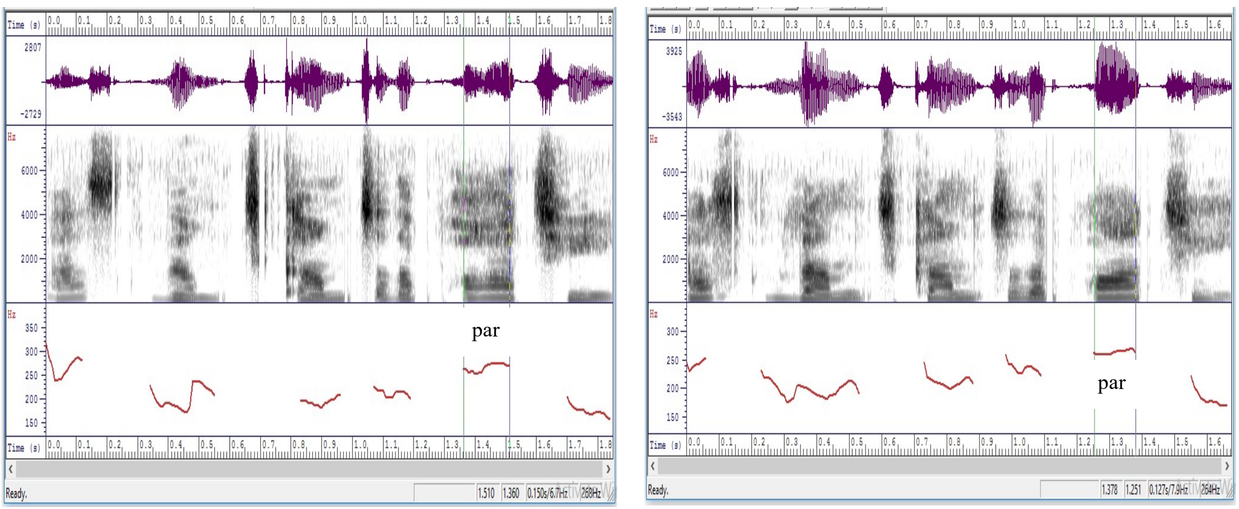


LTC: Black bird

Figure 4.26: Spectrographic images of *blackbird/black bird* as produced by the native baseline compared with sample LTC spectrographic images of *blackbird/black bird* as produced by UIYTU 131

The spectrograms of *blackbird* (compound noun)/*black bird* (noun phrase) as produced by the native baseline compared with a sample LTC spectrographic images of the same expressions as produced by UIYTU 131 are displayed in Figure 4.26. Rather than the pitch contrast observed in the NB spectrogram already analysed in Figure 4.24, the LTC spectrogram of *blackbird* displayed flatness for both expressions. However, the duration of *bird* was longer than the duration of *black* for both expressions as observed for the other categories.

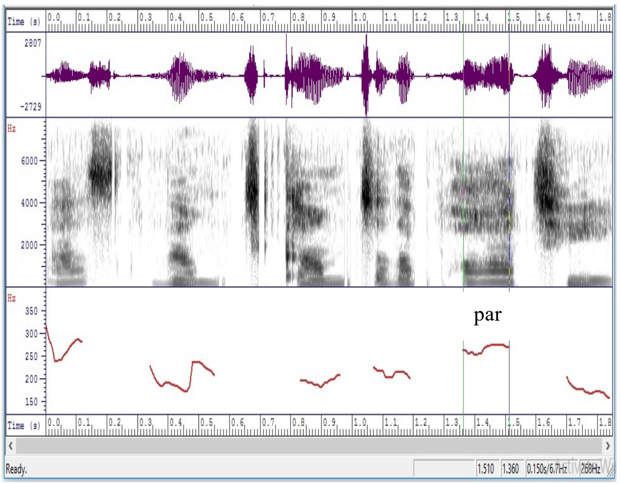
4.4.3 Dominant spectrographic patterns of *Ask them to come to the party*as produced by the native baseline and the UIYTUs



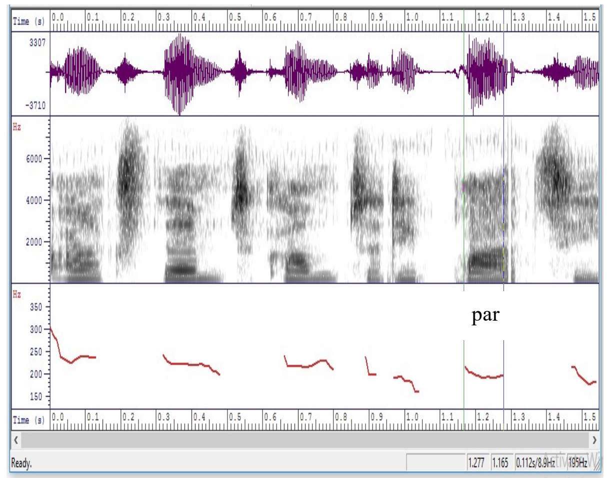
Native baseline HTC

Figure 4.27: Native baseline spectrogram of *Ask them to come to the party* compared with sample HTC spectrogram of *Ask them to come to the party* as produced by UIYTU 221

Figure 4.27 displays the NB spectrogram of *Ask them to come to the party* in comparison with sampleHTC spectrogram of *Ask them to come to the party.* The NB waveform and pitch contour shows *par-*was produced with the highest amplitude, at 268Hz and in 150ms, thereby assigning it the highestprominence in the sentence. In similar vein, The HTC spectrogram displays a pitch track which not only shows alternation between strong and weak syllables but also shows that the nuclearly stressedsyllables, *par-,* was produce with the highest amplitude and longest duration in the sentence.



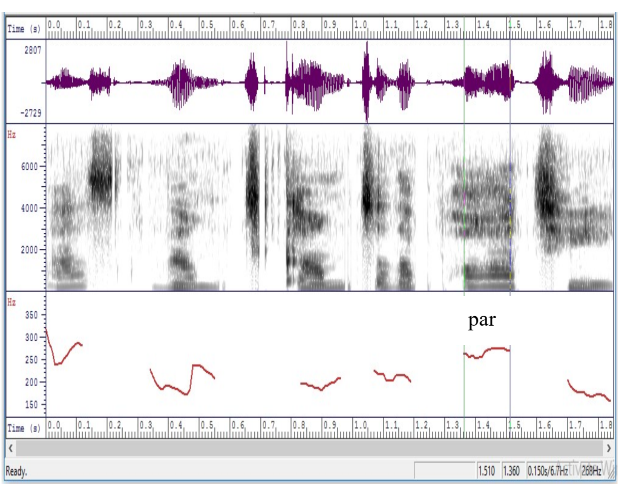
Native baseline



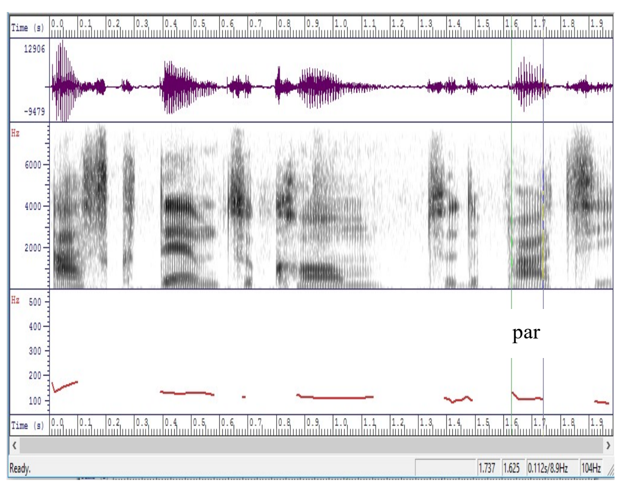
MTC

Figure 4.28: Native baseline spectrogram of *Ask them to come to the party* compared with sample MTC spectrogram of *Ask them to come to the party* as produced by UIYTU 231

The NB waveform and pitch contour show the alternation of strong and weak syllables in thesentence. It also shows that *par-* was produced with the highest amplitude, at 268Hz and in 150ms, thereby assigning it the highestprominence in the sentence. Although the spectrogram of the MTC display some alternation, *par-* which is supposed to be produced with the highest prominence didnot receive its due prominence.



Native baseline

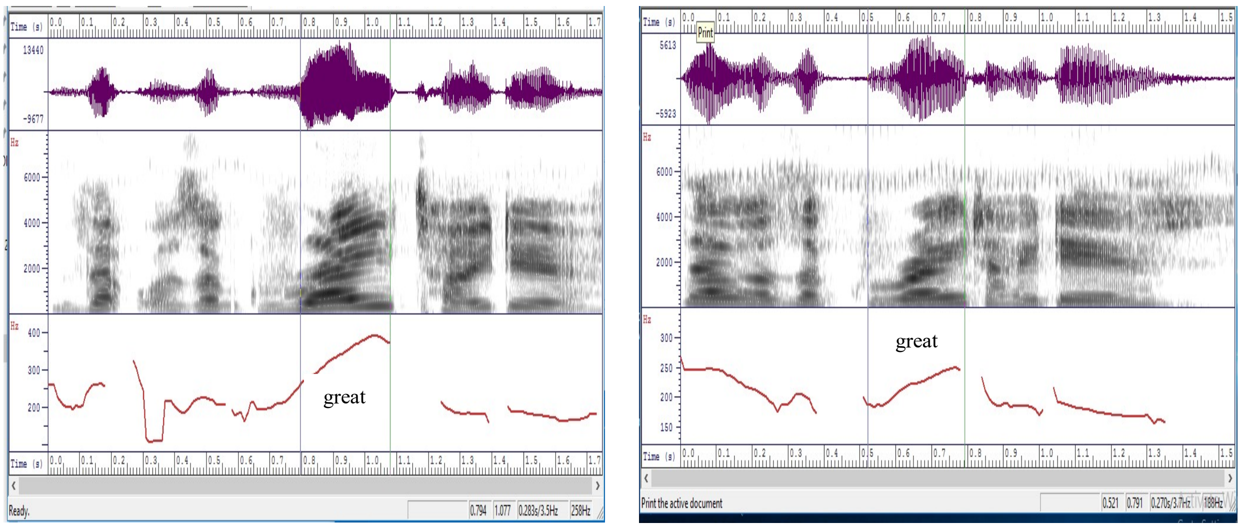


LTC

Figure 4.29: Native baseline spectrogram of *Ask them to come to the party* compared with sample LTC spectrogram of *Ask them to come to the party* as produced by UIYTU 97

While the spectrographic image of the native baseline show alternation of the strong and weak syllables, and the highest prominence on *par-,* the stronger DTE of the sentence, the LTC spectrogram display flatness.

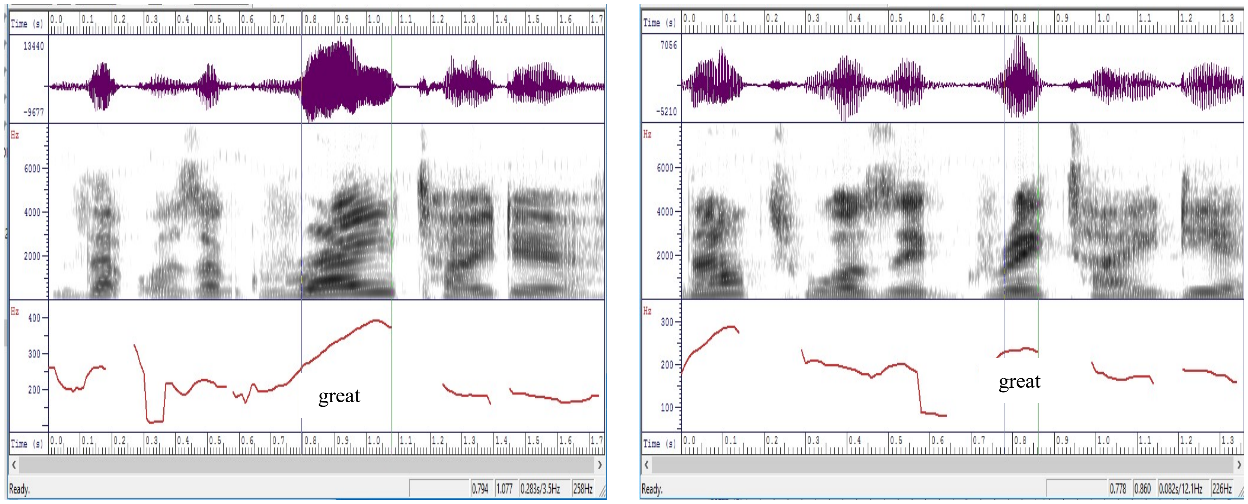
4.4.4 Dominant spectrographic patterns of *That was a GREAT idea*as produced by the native baseline and the UIYTUs



Native baseline HTC

Figure 4.30: Native baseline spectrogram of *That was a GREAT idea* compared with sample HTC spectrogram of *That was a GREAT idea* as produced by UIYTU 201

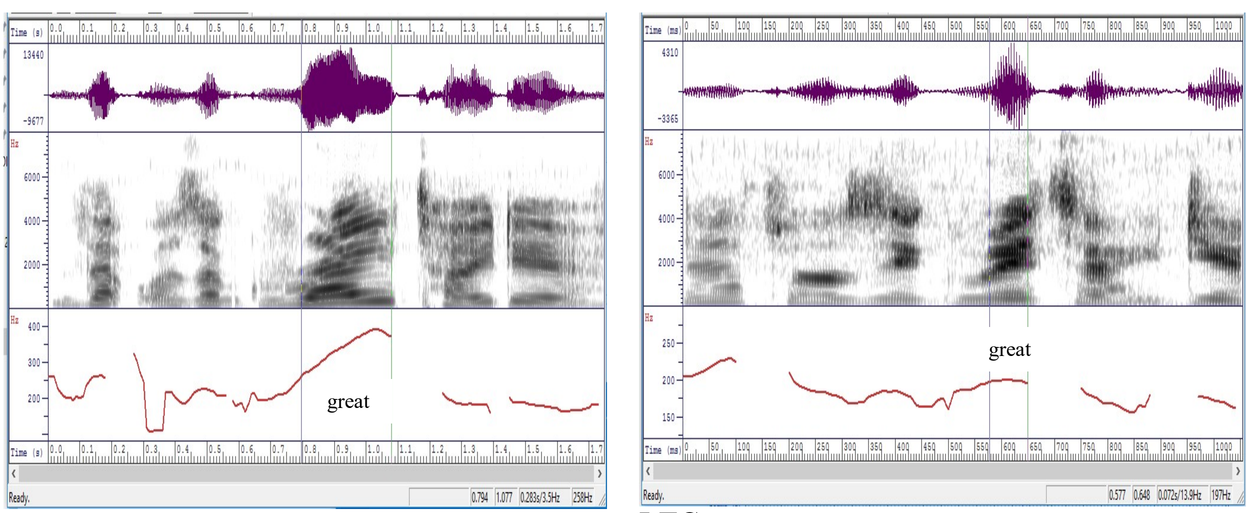
As observed in the spectrogram of *That was a GREAT idea* produced by the native baseline the prominence of *great* in relation to the other component syllables of the expression marks it for the nuclear stress. A pitch value of 258Hz and duration value of 1077ms are recorded for the syllable/word against the 192Hz pitch and 1056ms duration value of the default nuclearly stressed syllable. This makes the nuclear stress reassigned to *great* for contrastive purpose. The sample HTC spectrogram of the same expression shows that the HTC approximated to the NB in the meaning contrast by producing *great* at 249Hz and 791ms, a pitch and duration value higher than the pitch and duration value of the other syllables, the default nuclear syllable.



Native baseline MTC

Figure 4.31: Native baseline spectrogram of *That was a GREAT idea* compared with sample MTC spectrogram of *That was a GREAT idea* as produced by UIYTU 285

The sample MTC spectrogram of *That was a GREAT idea* as produced by UIYTU 285 in comparison with the native baseline spectrogram is presented in Figure 4.31. Although the MTC spectrogram display some alternation in the pitch contour and the waveform, the expected rise in pitch of the contrastively stressed syllable observed in the NB spectrogram is not clearly evident in the MTC's. The MTC duration of the syllable is much shorter than the value realised for the NB.



Native baseline LTC

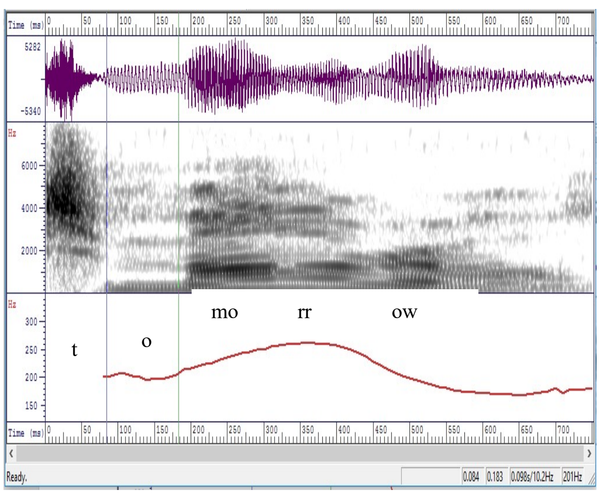
Figure 4.32: Native baseline spectrogram of *That was a GREAT idea* compared with sample LTC spectrogram of *That was a GREAT idea* as produced by UIYTU 193

The sample LTC spectrogram of *That was a GREAT idea* as produced by UIYTU 193 in comparison with the native baseline spectrogram is presented in Figure 4.32. Unlike what obtains in the NB spectrogram where the pitch and duration values of *great* are not just higher than the values of other syllables but are also higher than those of the default nuclearly stressed syllable, the LTC pitch track shows no such rise in pitch. In fact, the pitch of *great* is lower than the pitch of *that,* a grammatical word. Its duration is also much shorter than the native baseline's. This shows the LTC's little knowledge of using stress to contrast meaning.

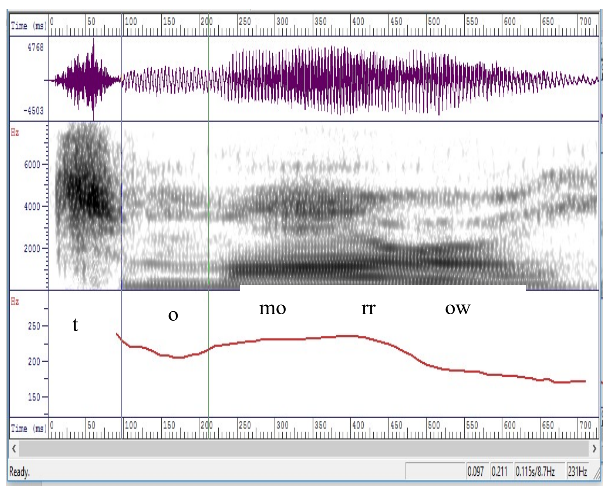
4.4.5 Dominant spectrographic patterns for UIYTUs' vowel reduction

For the acoustic analysis of reduced vowels, spectrograms of *tomorrow, the* and *threaten* as produced by a representative participant of each of the technology contact levels, showing the duration of the weak vowels, are compared with those of the baseline.

4.4.5.1 Dominant spectrographic patterns of *tomorrow*as produced by the native baseline and the UIYTUs



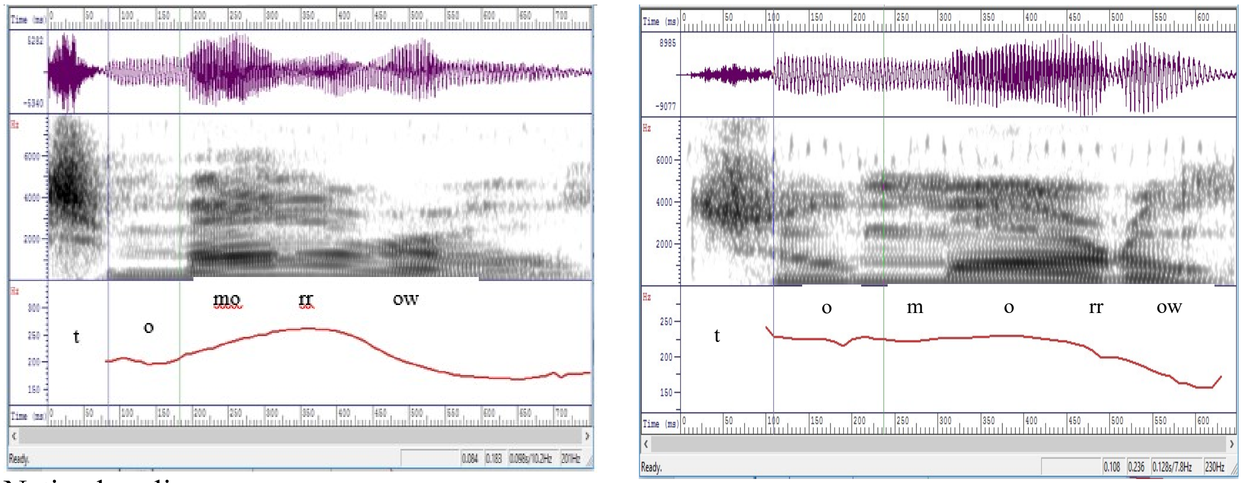
Native baseline



HTC

Figure 4.33: Native baseline spectrogram of *tomorrow* compared with sample HTC spectrogram of *tomorrow* as produced by UIYTU 03

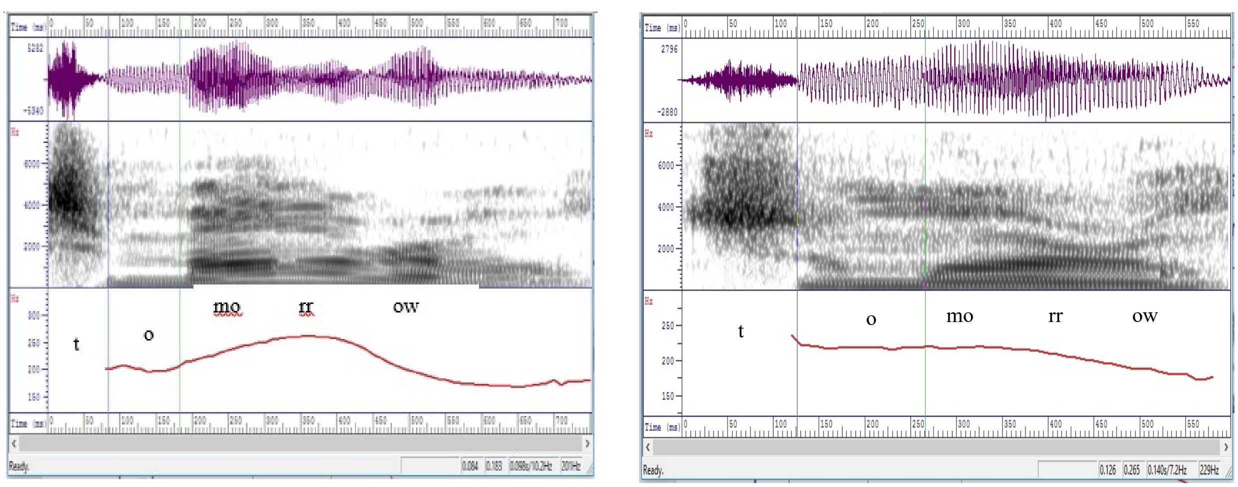
Figure 4.33 shows the native baseline spectrogram of *tomorrow* compared with a sample HTC spectrogram of the word as produced by UIYTU 03. The NB had a duration reading of 183ms on *to-* against the 408ms value of *-mor-*. The difference in the duration of the two syllables is 225ms. This shows that the NB produced the strong syllable with much longer duration than the weak one. The HTC produced *to-* in 211ms and *-mor-* in 288ms. The reading of the duration of the two syllables shows a difference of 77ms.



Native baseline MTC

Figure 4.34: Native baseline spectrogram of *tomorrow* compared with sample MTC spectrogram of *tomorrow* as produced by UIYTU 13

The native baseline spectrogram of *tomorrow* is compared with a sample MTC's in Figure 4.34. While the difference in the duration of *-mor-,* produced at 408ms, and the duration of *to-*, produced at 183ms, is 225ms in the NB rendition, thereby showing that the NB produced the strong syllable with much longer duration than the weak one, the MTC, having produced *-mor-* and *to-* in 259ms and 236ms respectively, had a duration difference of 23ms.

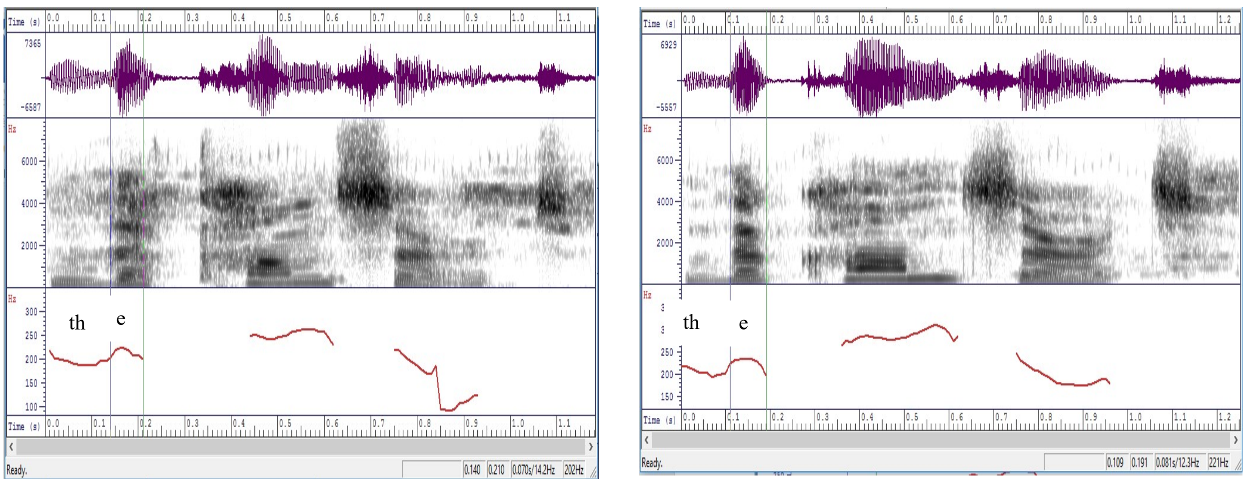


Native baseline LTC

Figure 4.35: Native baseline spectrogram of *tomorrow* compared with sample LTC spectrogram of *tomorrow* as produced by UIYTU 08

The native baseline waveform of *tomorrow* is compared with a sample LTC waveform in Figure 4.35. While the difference in the duration of *-mor-,* produced at 408ms, and the duration of *to-*, produced at 183ms, is 225ms in the NB rendition, thereby showing that the NB produced the strong syllable with much longer duration than the weak one, the LTC produced *-mor-* in 265ms and *to-* in 259ms. The difference in the duration of both syllables is 6ms, showing that the LTC produced both strong and weak syllables at equivalent duration.

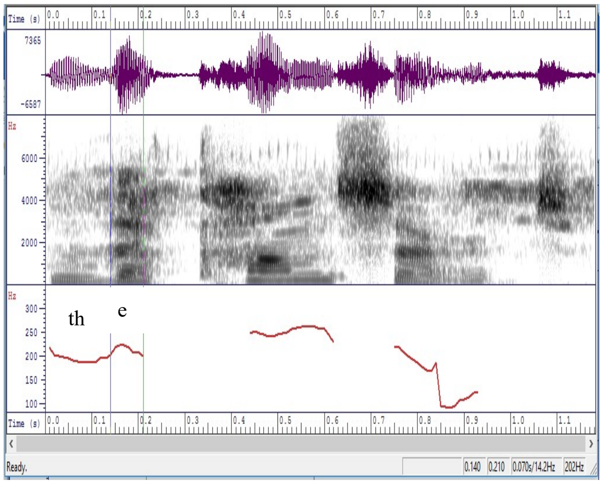
4.4.5.2 Dominant spectrographic patterns of *the children's*as produced by the native baseline and the UIYTUs



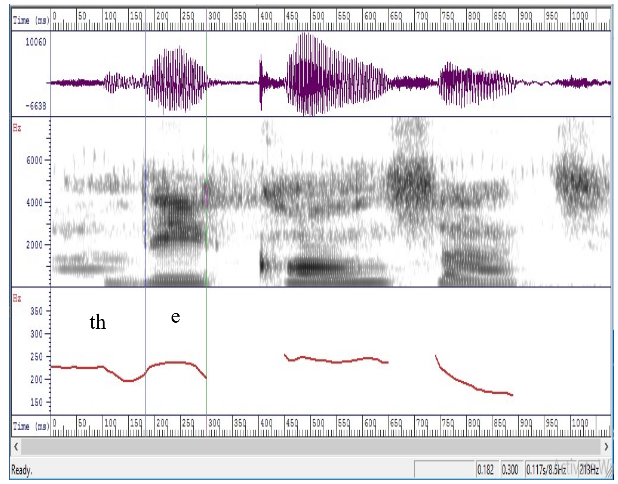
Native baseline HTC

Figure 4.36: Native baseline spectrogram of *the children's* compared with HTC spectrogram of *the children's* as produced by UIYTU 104 with focus on *the*

The duration of *the* in relation to other syllables in *the children's* as produced by the NB is compared with a sample HTC rendition in Figure 4.36. The duration value obtained for *the* in the NB rendition is 129ms while the values for *child* and *ren's* are 518ms and 265ms respectively. The differences between the duration values of *child* and *the* and the duration values of *ren's* and *the* are 389ms and 136ms respectively. This makes *the* the weakest syllable in the expression. In the HTC rendition, *the* is produced in 191ms while the values for *child* and *ren's* are 501ms and 322ms respectively. The differences between the duration values of *child* and *the* and the duration values of *ren's* and *the* are 112ms and 131ms respectively. This marks *the* as the weakest syllable in the expression.



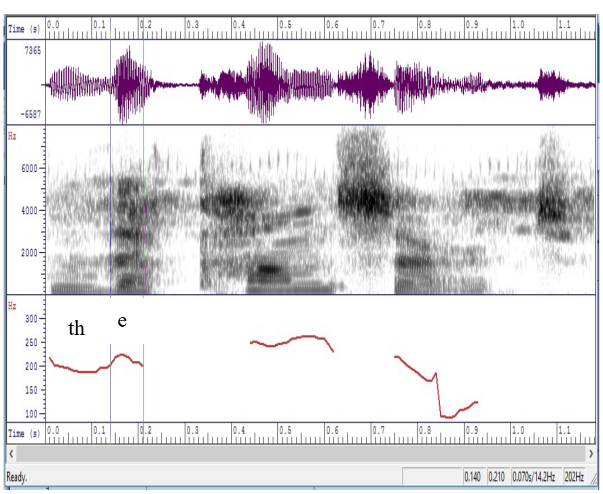
Native baseline

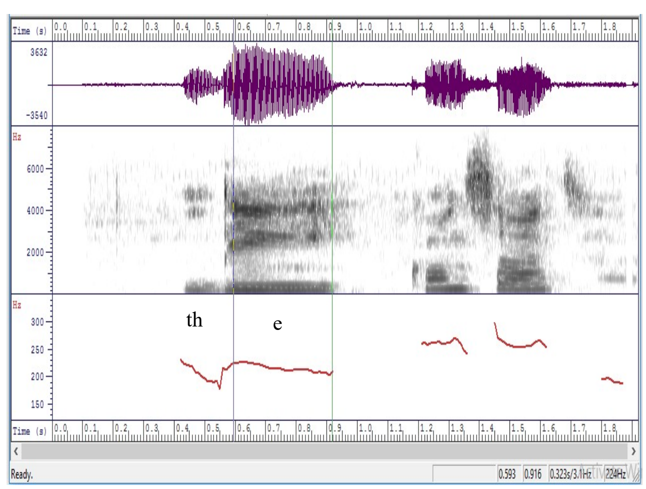


MTC

Figure 4.37: Native baseline spectrogram of *the children's* compared with MTC spectrogram of *the children's* as produced by UIYTU 113 with focus on *the*

The duration of *the* in relation to other syllables in *the children's* as produced by the NB is compared with a sample MTC rendition as produced by UIYTU 113 in Figure 4.37. As already established in Figure 4.36, *the* is distinctively the weakest syllable, with the least duration value, in *the children's*. In the MTC rendition, *the* is produced in 300ms while the values for *child* and *ren's* are 426ms and 312ms respectively. The differences between the duration values of *child* and *the* and the duration values of *ren's* and *the* are 126ms and 12ms respectively. This marks *the* as the weakest syllable in the expression. However, the difference between the duration of *ren's* and *the* is negligible compared to the differences obtained in the NB and the HTC renditions.





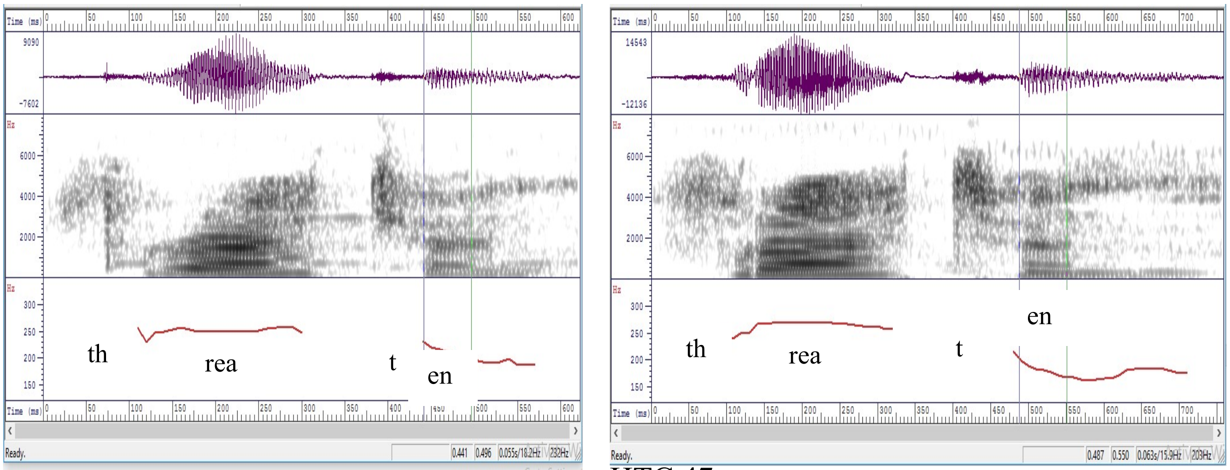
LTC

Native baseline

Figure 4.38: Native baseline spectrogram of *the children's* compared with sample LTC spectrogram of *the children's* as produced by UIYTU 86 with focus on *the*

Figure 4.38 shows the native baseline spectrogram of *the children's* compared with a sample LTC spectrogram of *the children's* as produced by UIYTU 86. In the LTC spectrogram, *the* is produced in 323ms, much longer than the NB duration, while the values for *child-* and *-ren's* are 359ms and 533ms respectively. The differences between the duration values of *child-* and *the* and the duration values of *-ren's* and *the* are 36ms and 210ms respectively. Contrary to the native baseline production, *-ren's* is produced with the longest duration. Although *the* is marked as the weakest syllable in the expression, its duration is only 36ms less than the duration of *child-*. This is in contrast with the NB rendition where the difference between the two syllables is 389ms.

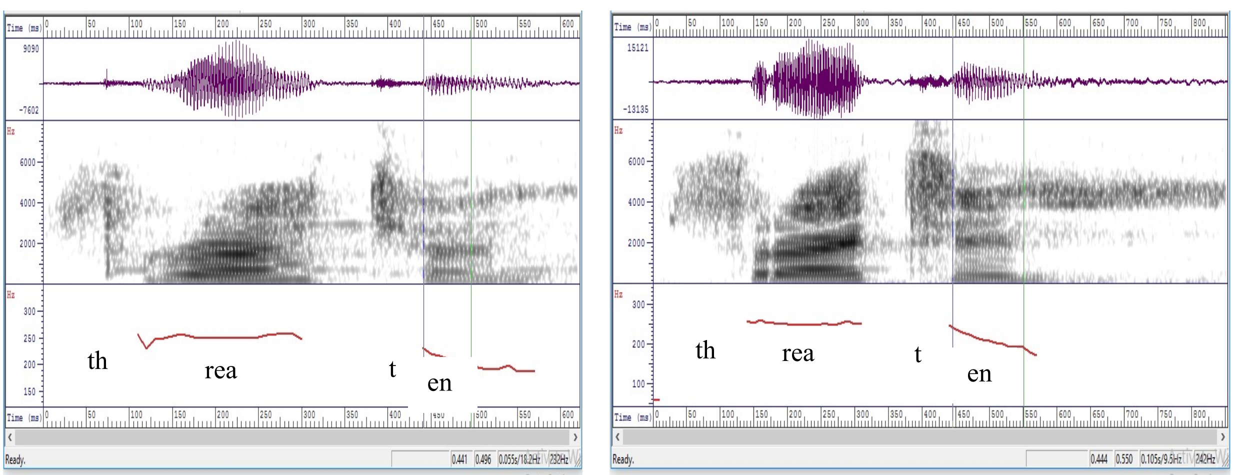
4.4.5.3 Dominant spectrographic patterns of *threaten*as produced by the native baseline and the UIYTUs



Native baseline HTC 47

Figure 4.39: Native baseline spectrogram of *threaten* compared with HTC spectrogram of *threaten* as produced by UIYTU 47

The duration of -*ten* relative to *threa*- as produced by the NB is compared with a sample HTC rendition of *threaten* as produced by UIYTU 47 in Figure 4.39. The duration value read for -*ten* in the NB production is 55ms while the value for *threa*- is 281ms. The difference evidently shows that the NB produced -*ten* significantly weaker than its stressed counterpart. The HTC, in a similar manner, produced -*ten* in 63ms while the duration obtained for *threa*- is 273ms.

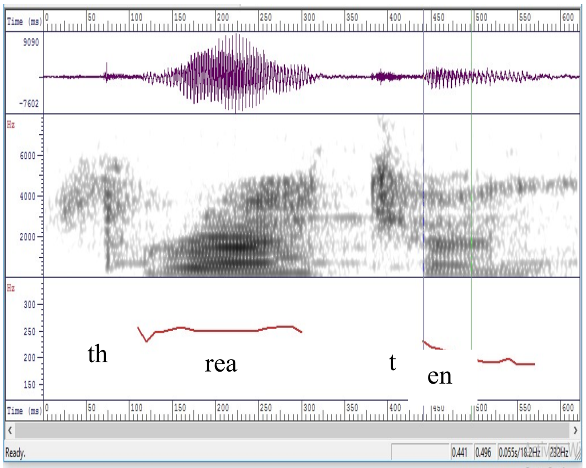


Native baseline MTC 53

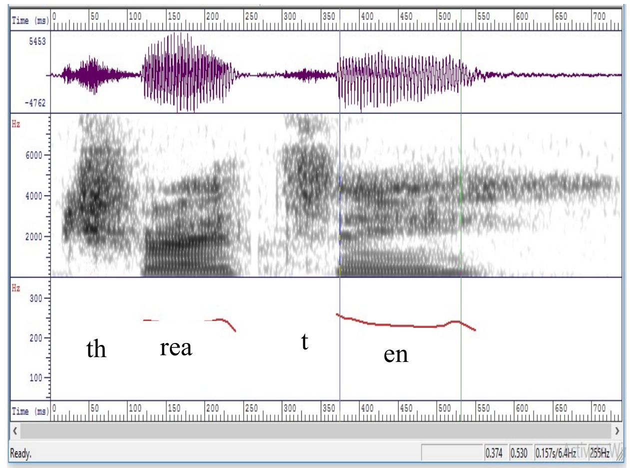
Figure 4.40: Native baseline spectrogram of *threaten* compared with sample MTC spectrogram of *threaten* as produced by UIYTU 53

The native baseline and a sample MTC spectrogram of *threaten* as produced by UIYTU 53 are displayed in Figure 4.40 for comparison. The difference in the duration of both syllables evidently shows that the NB produced -*ten* significantly shorter than its stressed counterpart, *threa*.

The MTC, in a similar manner, produced -*ten* in105ms while the duration obtained for *threa-* is 215ms. Given the difference in the durations of the two syllables (110ms), the MTC mainly weakened -*ten*.



Native baseline



LTC 67

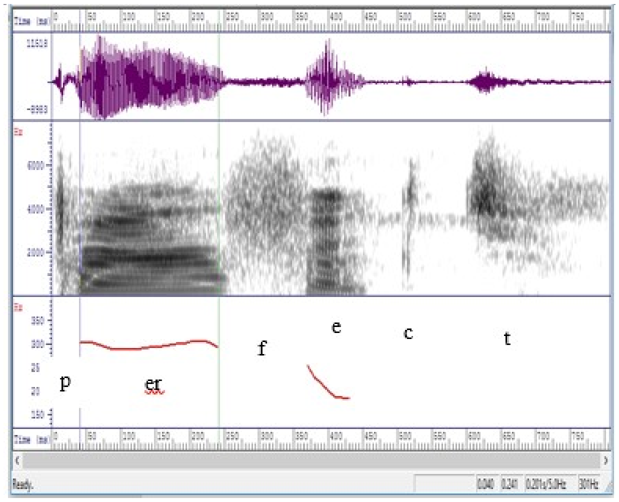
Figure 4.41: Native baseline spectrogram of *threaten* compared with LTC spectrogram of *threaten* as produced by UIYTU 67

The native baseline and a sample LTC spectrogram of *threaten* as produced by UIYTU 67 are displayed in Figure 4.41 for comparison. The difference in the duration of both syllables evidently shows that the NB produced -*ten* significantly shorter than its stressed counterpart. The LTC produced -*ten* in 157ms while the duration obtained for *threa-* is 220ms, giving a difference of 63ms in the durations of the two syllables. Although the UIYTUs mainly weakened -*ten,* in relation to *threa-*, it is observed that the lower the level of technology contact, the lower the difference in the duration of both syllables.

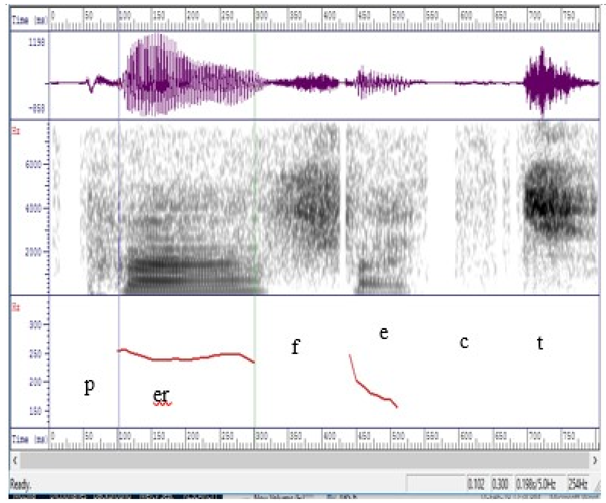
4.4.6 Dominant spectrographic patterns for UIYTUs' stress shift

For the acoustic readings of stress shift, spectrograms of*perfect* and *perfection, conduct (noun)* and *conduct (verb)* and *she was thirteen yesterday* as produced by a representative participant of each of the technology contact levels are compared with the native baseline.

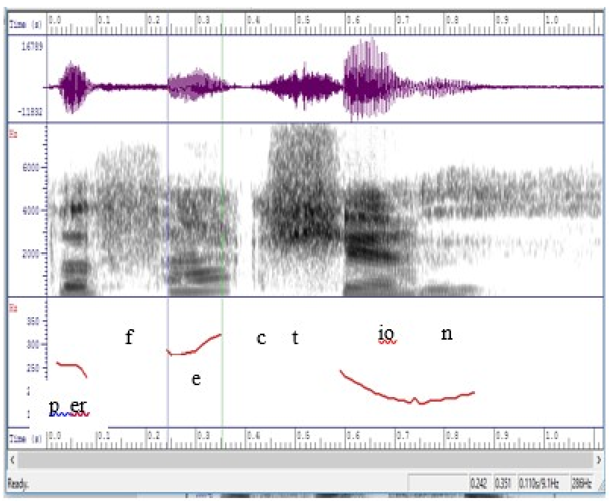
4.4.6.1 Dominant spectrographic patterns of *perfect* and *perfection*as produced by the native baseline and the UIYTUs



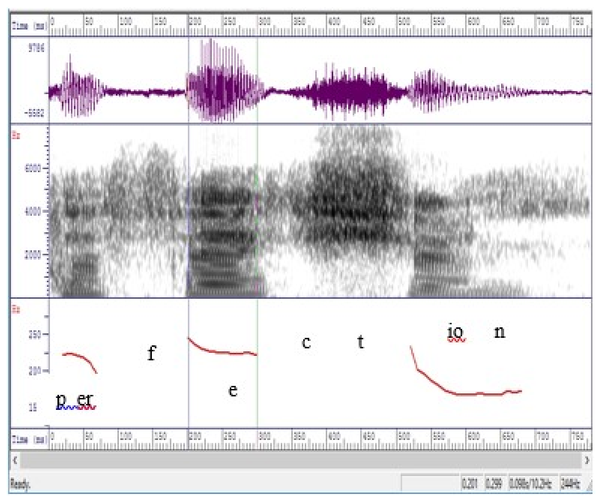
Native baseline: Perfect



HTC: Perfect



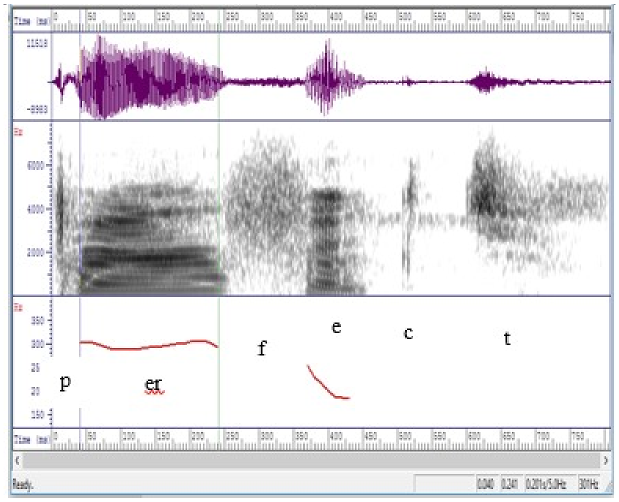
Native baseline: Perfection



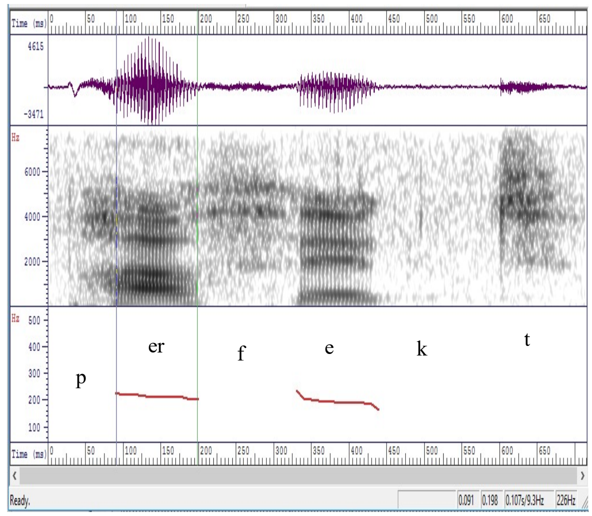
HTC: Perfection

Figure 4.42: Native baseline spectrograms of *perfect* and *perfection* compared with sample HTC spectrograms of *perfect* and *perfection* as produced by UIYTU 245

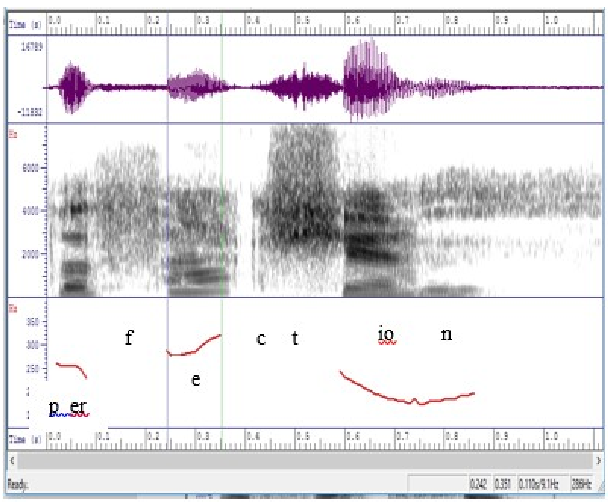
The spectrographic images of *perfect* and *perfection* as produced by the native baseline in comparison with a sample HTC spectrographic images of the same words as produced by UIYTU 245 are displayed in Figure 4.42. The pitch contour and waveform of the NB and the HTC show that *per-* was produced at a higher pitch and longer duration than *-fect.* The stress shift from *per-* to *-fec-* as observed in the NB spectrogram of *perfection* is also visible on the HTC image. The pitch and the duration readings of *-fec(t)-,* which was initially measured at 209Hz and 106ms respectively against the 265Hz and 141ms of *per-,* is measured at 244Hz and 299ms against the 221Hz and 189ms of *per-*, showing that the expected stress shift was realised.



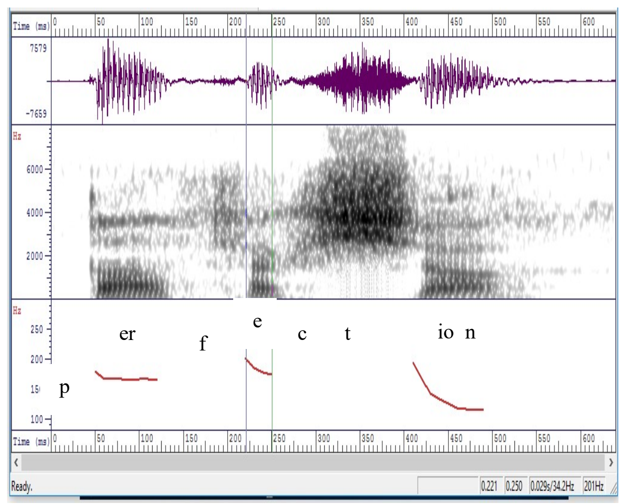
Native baseline: Perfect



MTC: Perfect



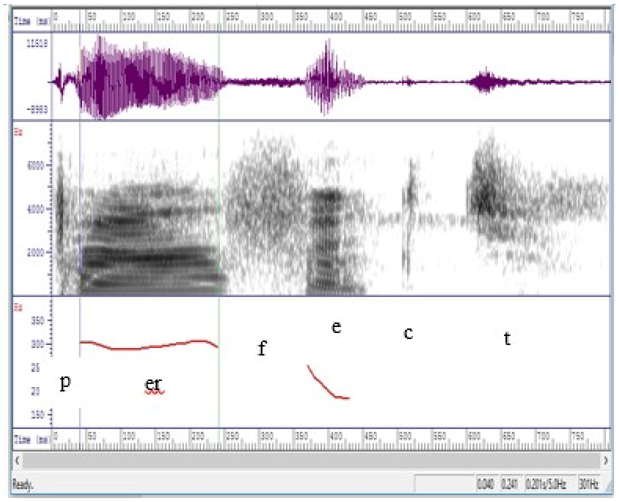
Native baseline: Perfection



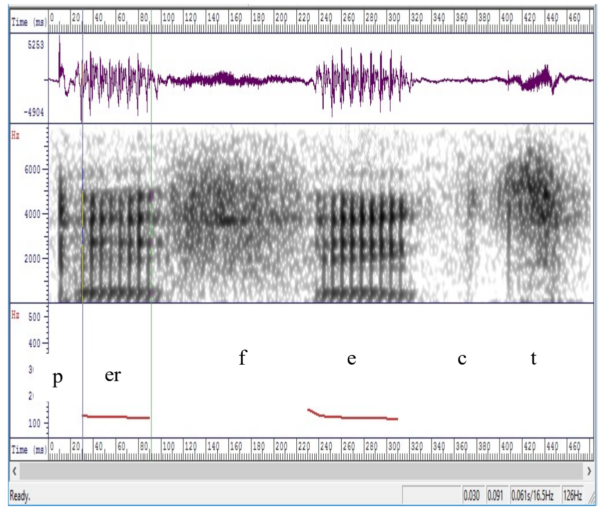
MTC: Perfection

Figure 4.43: Native baseline spectrograms of *perfect* and *perfection* compared with sample MTC spectrograms of *perfect* and *perfection* as produced by UIYTU 282

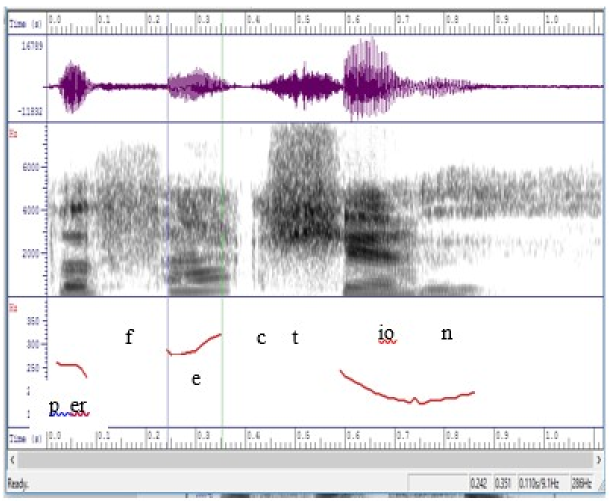
The MTC spectrogram of *perfect* shows flatness rather than a modulation of pitch. Both syllables are produced at equivalent duration. The shift of stress in the NB image of *perfection* is not conspicuously realised in the MTC's. The pitch of *-fec-* (201Hz) is only slightly higher than that of *per-* (193Hz). The non-shift of the stress is more evident in the duration of both syllables as the former is measured at 250ms while the latter which is expected to be shorter is measured at 324ms.



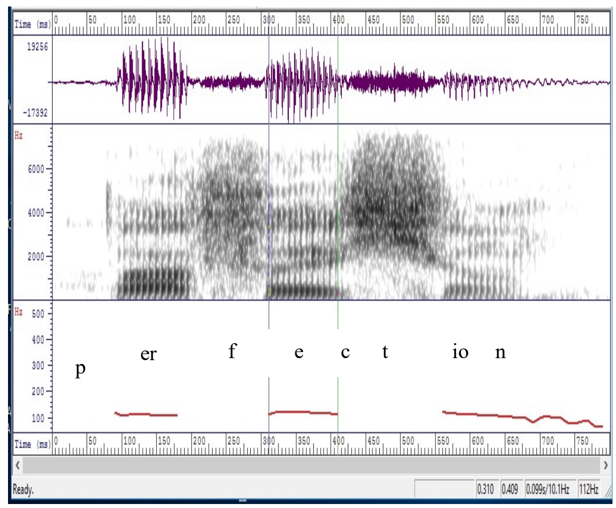
Native baseline: Perfect



LTC: Perfect



Native baseline: Perfection

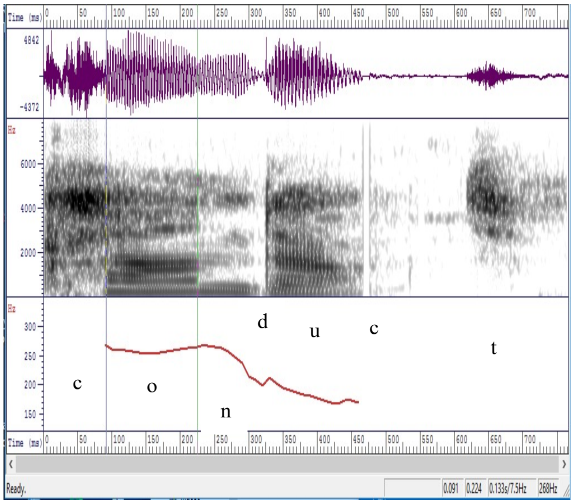


LTC: Perfection

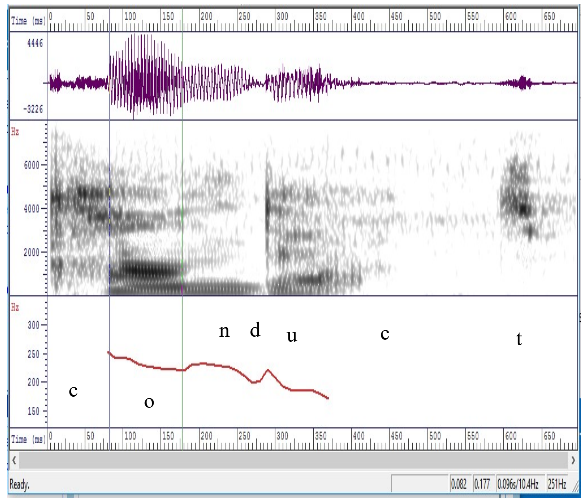
Figure 4.44: Native baseline spectrograms of *perfect* and *perfection* compared with sample LTC spectrograms of *perfect* and *perfection* as produced by UIYTU 258

Figure 4.44 shows the native baseline spectrograms of *perfect* and *perfection* compared with a sample LTC spectrograms of *perfect* and *perfection* as produced by UIYTU 258. Unlike the NB rendition, the LTC production is flat and lacks the expected durational contrast.

4.4.6.2 Dominant spectrographic patterns of ˈ*conduct (noun)* and *con*ˈ*duct (verb)*as produced by the native baseline and the UIYTUs

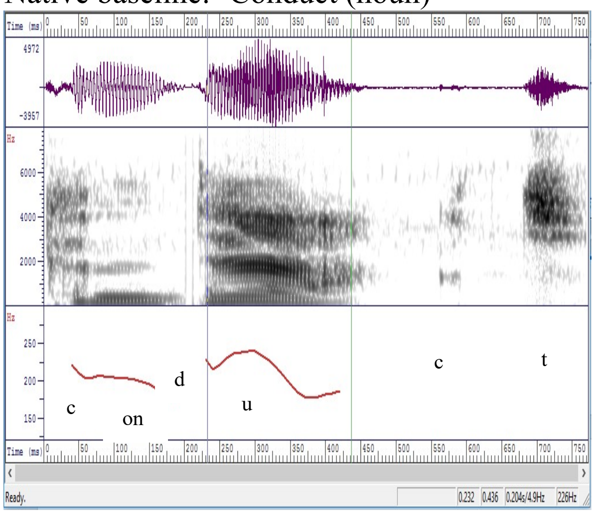


Native baseline: ˈConduct (noun)

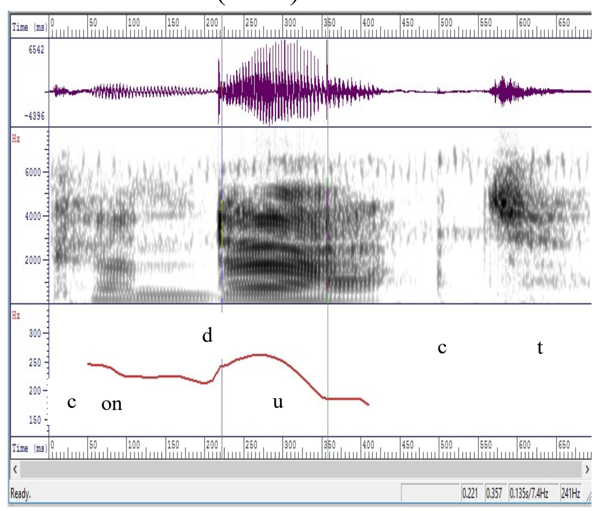


HTC: ˈConduct (noun)

t



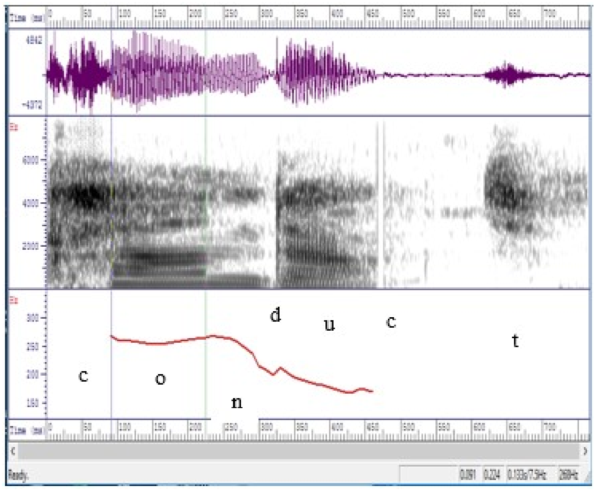
Native baseline: ConˈDuct (verb)



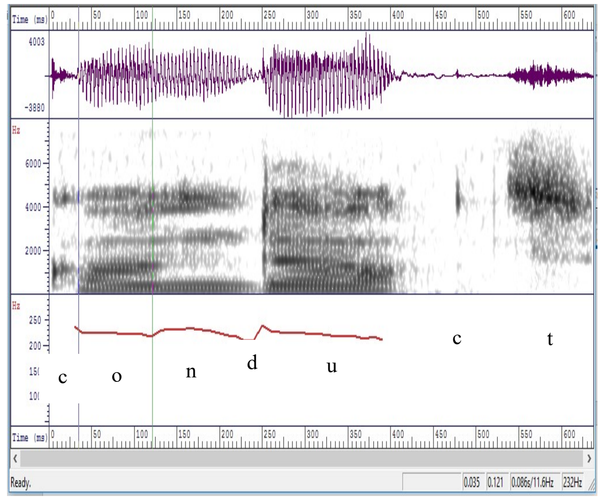
HTC: ConˈDuct (verb)

Figure 4.45: Native baseline spectrograms of ˈ*conduct (noun)* and *con*ˈ*duct (verb)* compared with sample HTC spectrograms of ˈ*conduct (noun)* and *con*ˈ*duct (verb)* as produced by UIYTU 250

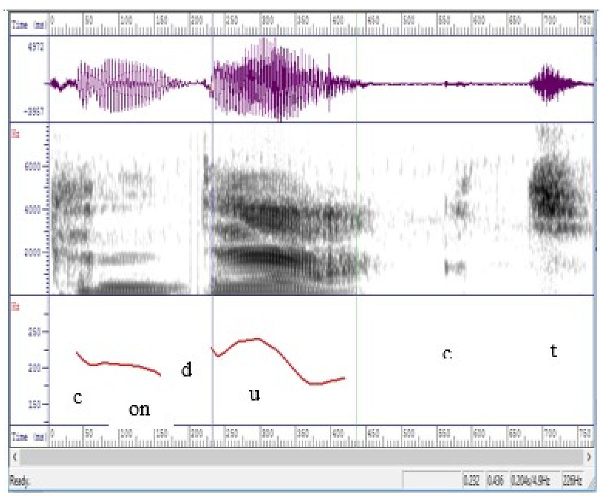
The spectrographic images of ˈ*conduct* and *con*ˈ*duct* as produced by the native baseline and a sample HTC spectrogram of the same words as produced by UIYTU 250 are displayed in Figure 4.45. The first syllable of ˈ*conduct*in the NB image displays the highest prominence and is marked for the primary stress considering its pitch value of 268Hz and duration of 201ms against the 224Hz/146ms readings of the second syllable. In the verb form, the second syllable is marked for primary stress considering its respective pitch and duration of 252Hz and 436ms against the 208Hz and 242ms of the first syllable. In the sample HTC image, the first syllable of *conduct (N)* was produced at 251Hz and 177ms while the second was produced at 226Hz and in 124ms, thereby making the initial syllable the most prominent. The second syllable of *conduct (V)* is produced most prominently, given its pitch and duration readings of 264Hz and 240ms, compared with the 237Hz and 223ms of the first syllable.



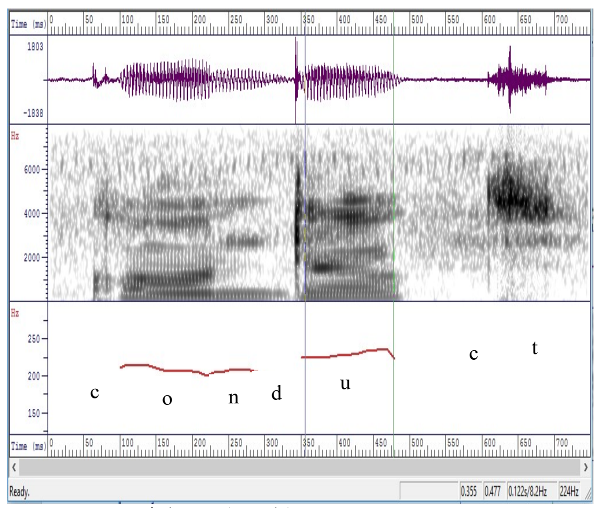
Native baseline: ˈConduct (noun)



MTC: ˈConduct (noun)



Native baseline: Conˈduct (verb)

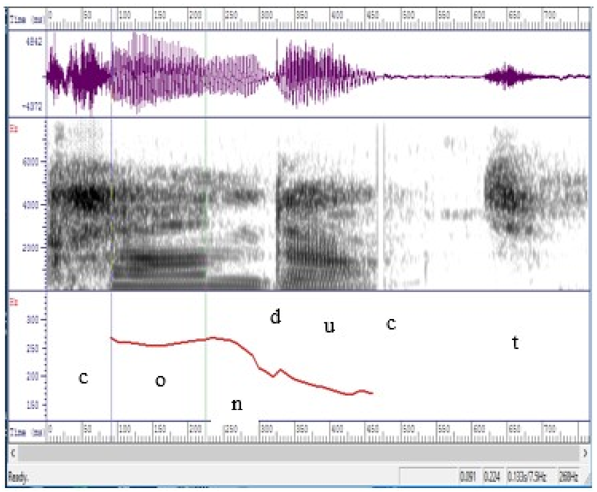


MTC: Conˈduct (verb)

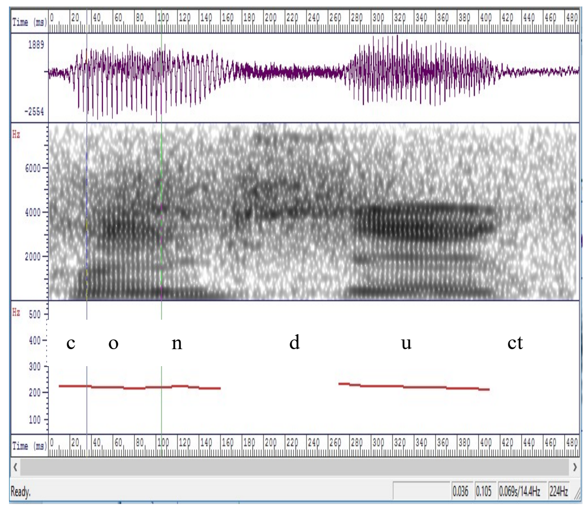
Figure 4.46: Native baseline spectrograms of ˈ*conduct (noun)* and *conˈduct (verb)* compared with sample MTC spectrograms of ˈ*conduct (noun)* and *conˈduct (verb)* as produced by UIYTU 200

Figure 4.46 displays the sample MTC spectrograms of ˈ*conduct (noun)* and *conˈduct (verb*) as produced by UIYTU 200 in comparison with the native baseline's, already analysed above. The distinctive rise in pitch of the stressed syllables of both words is not evident on the sample MTC images. The first syllable of *conduct (N)* in the MTC spectrogram was produced at 232Hz and

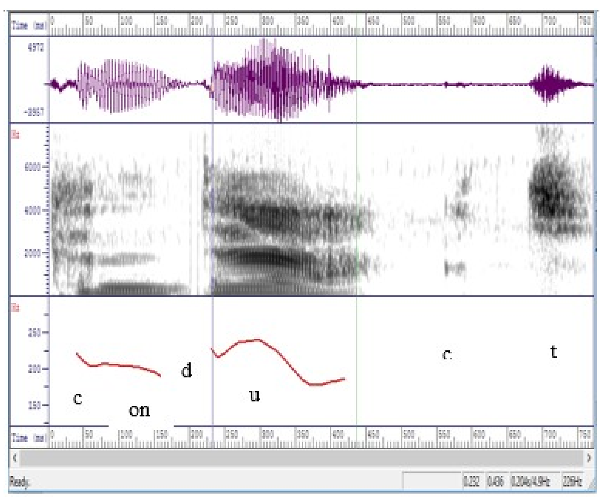
121ms while the second was produced at 218Hz and in 208ms. With this readings, it is difficult to ascribe prominence to any of the syllables as the first is higher in pitch than the second while the second is longer in duration than the first. Also, the pitch and duration readings of both syllables of *conduct (V)* do not show much difference between the pitch and duration of the first (209Hz/458ms) and those of the second (224Hz/447ms), hence the flatness of the pitch track.



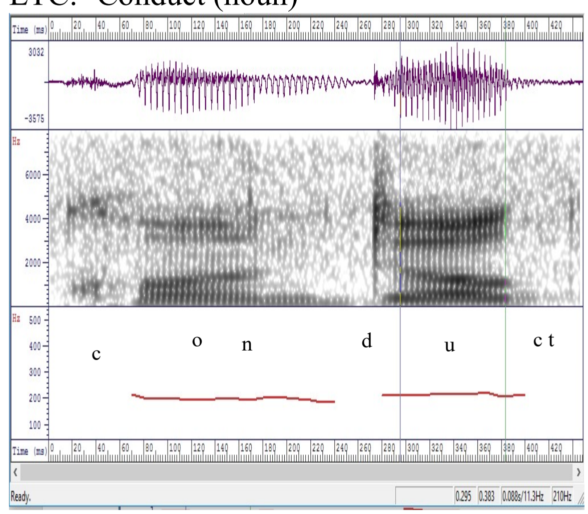
Native baseline: ˈConduct (noun)



LTC: ˈConduct (noun)



Native baseline: Conˈduct (verb)



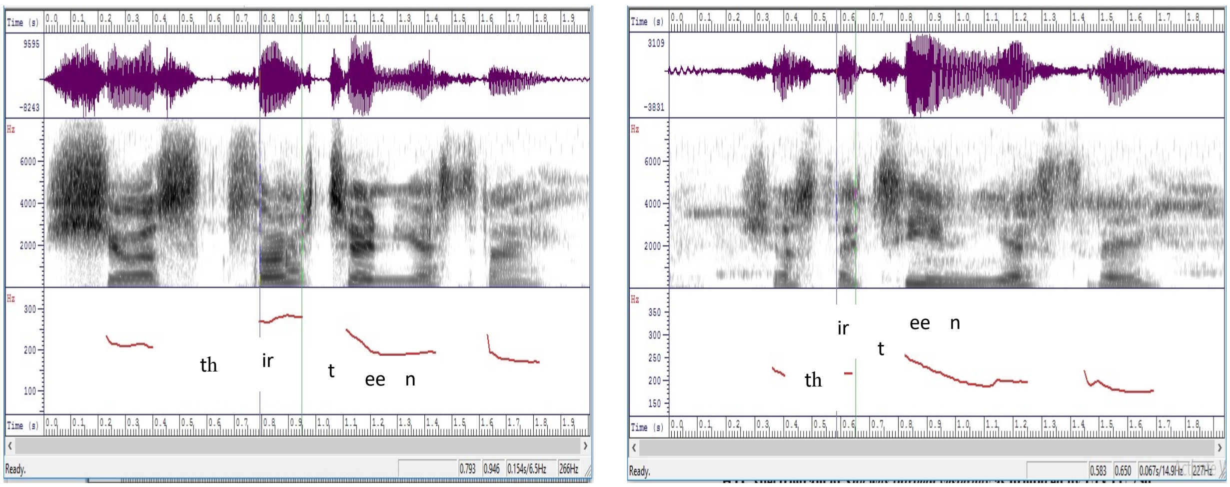
LTC: Conˈduct (verb)

c

Figure 4.47: Native baseline spectrograms of ˈ*conduct (noun)* and *conˈduct (verb)* compared with sample LTC spectrograms of ˈ*conduct (noun)* and *conˈduct (verb)* as produced by UIYTU 211

Figure 4.47 displays the sample LTC spectrograms of ˈ*conduct (noun)* and *conˈduct (verb)* as produced by UIYTU 211 compared with the native baseline's. Unlike the pitch modulation and durational contrast between stressed and unstressed syllables of both words in the NB rendition already analysed above, the LTC pitch track lack the expected modulation. As observed in the spectrogram, the duration of the stressed syllables does not seem longer than that of the unstressed syllables.

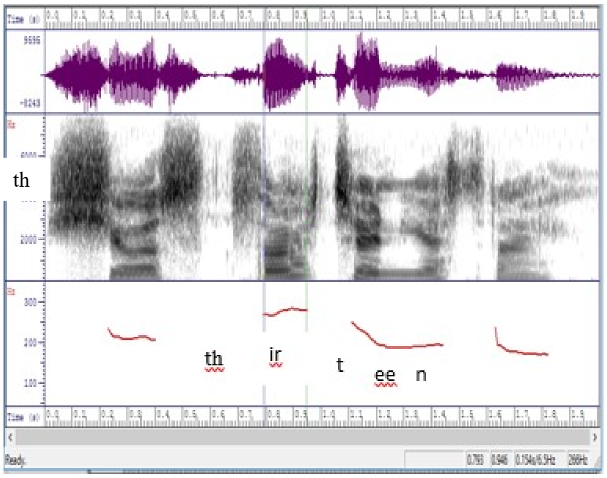
4.4.6.3 Dominant spectrographic patterns of *She was thirteen yesterday* as produced by the native baseline and the UIYTUs



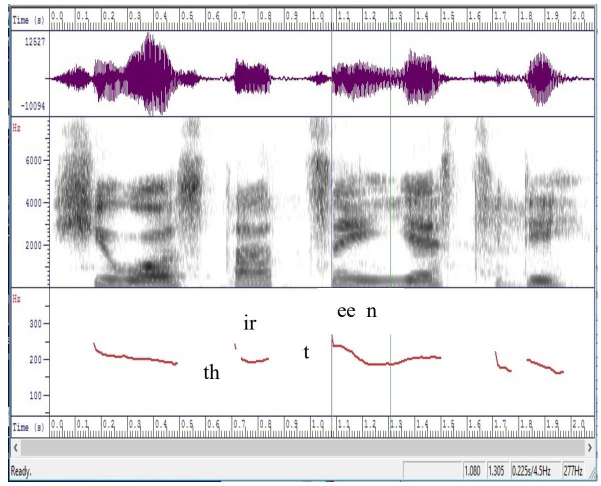
Native baseline HTC

Figure 4.48: Native baseline spectrogram of *She was thirteen yesterday* compared with sample HTC spectrogram of *She was thirteen yesterday* as produced by UIYTU 250

The spectrographic image of *She was thirteen yesterday* as produced by the native baseline in comparison with a sample HTC spectrographic image of the same expression as produced by UIYTU 250 are displayed in Figure 4.48 with focus on *thirteen*. The stress shift from *-teen* to *thir-* observed in the NB spectrogram in order to space out stress between *-teen* and *yes-* is not realised in the HTC rendition. Unlike the NB pitch and duration readings of 266Hz and 154ms for *thir-* against the 238Hz and 136ms of *-teen*, the HTC retained the iambic pattern of *thirteen* as in isolation considering the 227Hz/67ms of *thir-* contrasted with 254Hz/305ms of *-teen.* By this reading, the HTC did not space out stress as done by the NB.



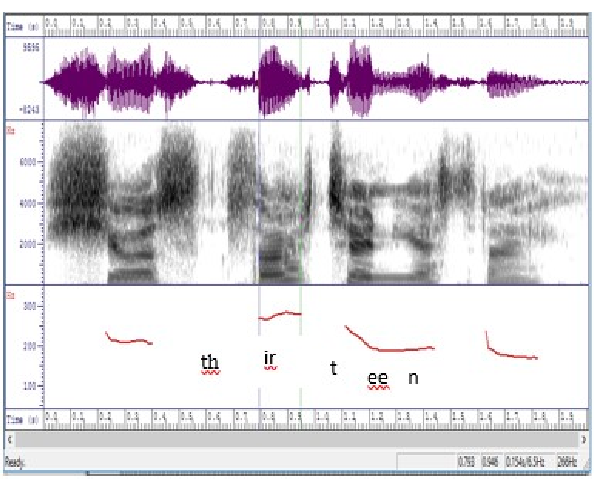
Native baseline



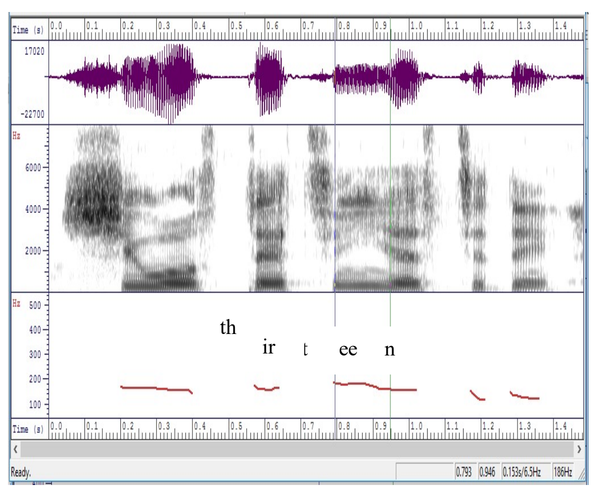
MTC

Figure 4.49: Native baseline spectrogram of *She was thirteen yesterday* compared with sample MTC spectrogram of *She was thirteen yesterday* as produced by UIYTU 200

Figure 4.49 shows the spectrogram of *She was thirteen yesterday* as produced by the native baseline in comparison with a sample MTC spectrogram as produced by UIYTU 200 with focus on *thirteen*. While the NB shifted stress from *-teen* to *thir-* in order to space out stress between *-teen* and *yes-* based on the higher pitch and longer duration of the *thir-*, the MTC retained the iambic pattern of *thirteen* as in isolation, given the 249Hz/203ms of *thir- against the* 277Hz/225ms of *-teen.* By this reading, the MTC did not space out stress as done by the NB.



Native baseline

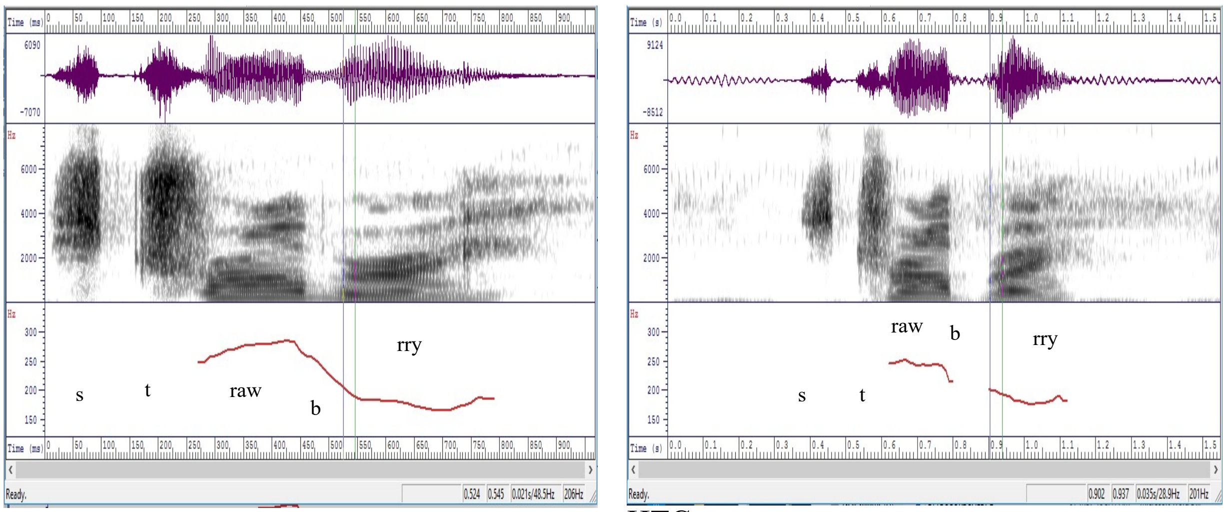


LTC

Figure 4.50: Native baseline spectrogram of *She was thirteen yesterday* compared with sample LTC spectrogram of *She was thirteen yesterday* as produced by UIYTU 211

Figure 4.50 shows the spectrogram of *She was thirteen yesterday* as produced by the native baseline in comparison with a sample LTC spectrogram as produced by UIYTU 211 with focus on *thirteen*. While the NB shifted stress from -*teen* to *thir*- in order to space out stress between -*teen* and *yes*- based on the higher pitch and longer duration of the *thir*-, the LTC retained the iambic pattern of *thirteen*, given the 186Hz/153ms of *thir- against the* 179Hz/137ms of -*teen.*

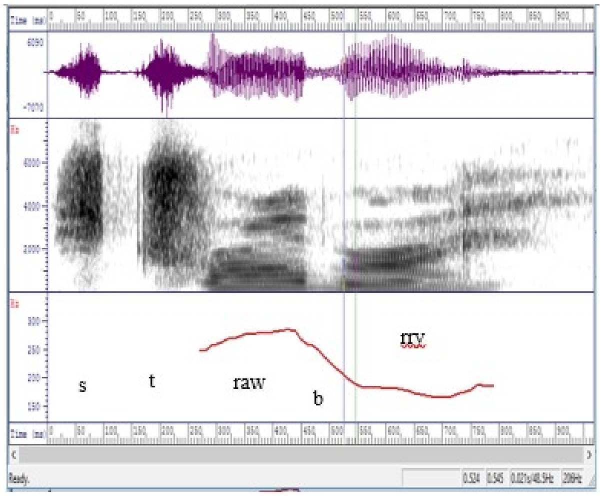
4.4.7 Dominant spectrographic images of *strawberry* as produced by the native baseline and the UIYTUs



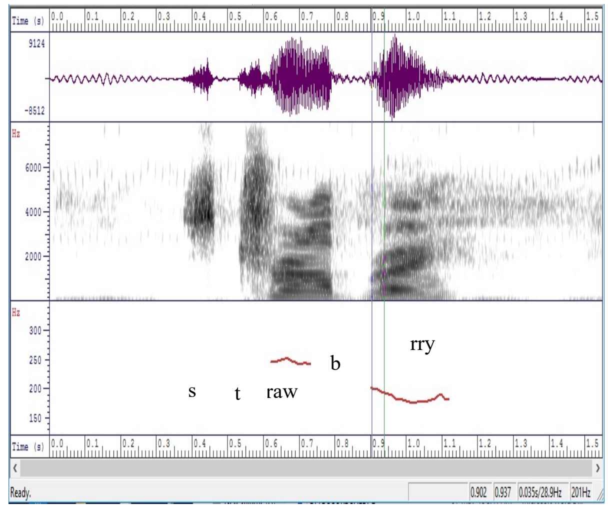
Native baseline HTC

Figure 4.51: Native baseline spectrogram of *strawberry* compared with sample HTC spectrogram of *strawberry* as produced by UIYTU 221

Figure 4.51 reveals the similarity between the native baseline spectrogram of *strawberry* and a sample HTC spectrogram of *strawberry* as produced by UIYTU 221. Both images show that *straw*- is produced with higher pitch and longer duration than -*berry*. The expected elision also took place.



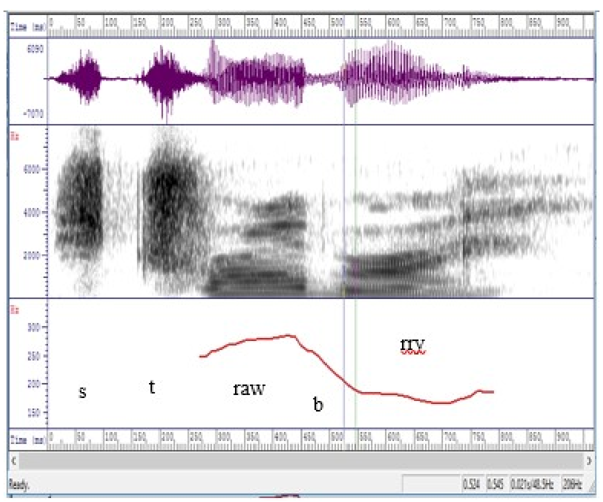
Native baseline



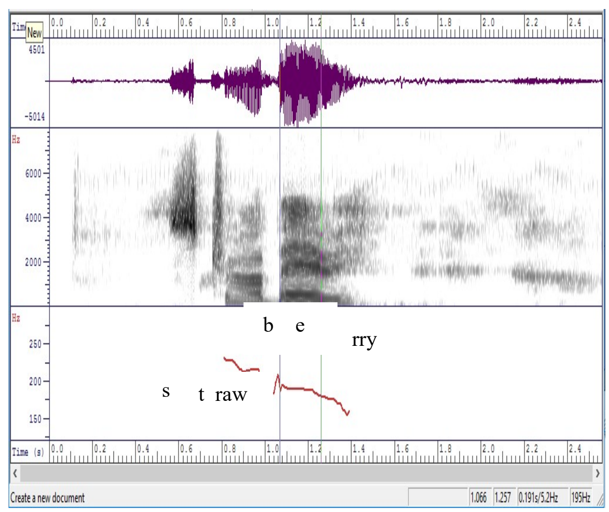
MTC

Figure 4.52: Native baseline spectrogram of *strawberry* compared with sample MTC spectrogram of *strawberry* as produced by UIYTU 216

Figure 4.52 shows the similarity between the native baseline spectrogram of *strawberry* and a sample HTC spectrogram of *strawberry* as produced by UIYTU 216. Both images show that *straw*- is produced with higher pitch and longer duration than -*berry*. The expected elision also occurred.



Native baseline



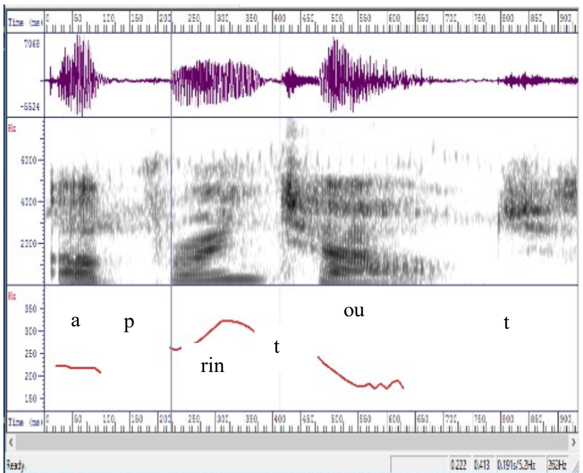
LTC

Figure 4.53: Native baseline spectrogram of *strawberry* compared with sample LTC spectrogram of *strawberry* as produced by UIYTU 260

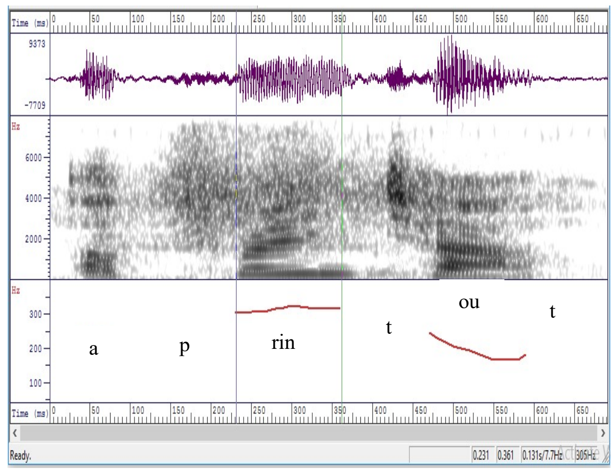
Although *straw*- is produced at a higher pitch than the other syllable, the LTC rendition did not elide the nucleus of the second syllable.

4.4.8 Dominant spectrographic patterns of *a printout* as produced by the native baseline and the UIYTUs

Acoustic readings of the pitch and duration of the three syllables of *aprintout,*extracted from the spectrograms of the UIYTUs are compared with the native baseline readings for observable differences.



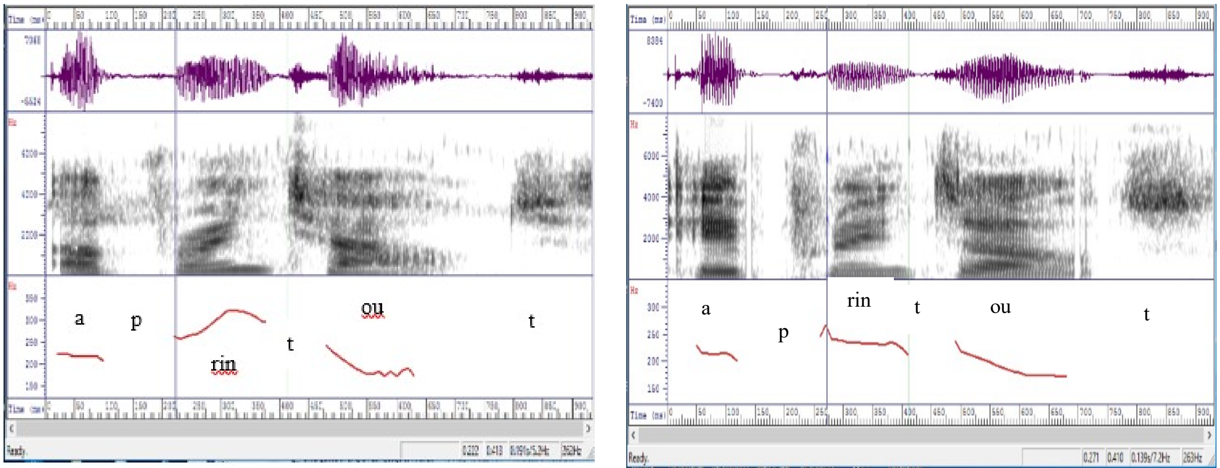
Native baseline



HTC 250

Figure 4.54: Native baseline spectrogram of *a printout* compared with sample HTC spectrogram of *a printout* as produced by UIYTU 250

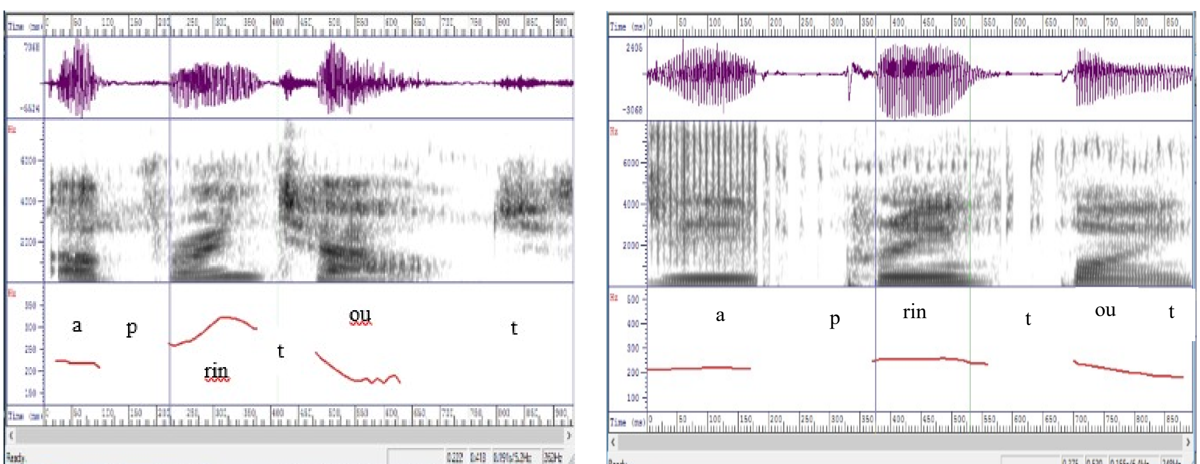
Figure 4.54 displays the native baseline spectrogram of *a printout* compared with sample HTC spectrogram of the compound-headed NP as produced by UIYTU 250. The NB pitch contour and the waveform shows the highest prominence and the longest duration on *print-* relative to the other component syllables. A similar occurrence is found in the HTC spectrogram with a pitch and duration reading of 305Hz/361ms for *print-* against 245Hz/272ms for the final syllable and 239Hz/71ms for the initial syllable.



Native baseline MTC

Figure 4.55: Native baseline spectrogram of *a printout* compared with sample MTC spectrogram of *a printout* as produced by UIYTU 216

Figure 4.55 shows the native baseline spectrogram of *a printout* compared with sample HTC spectrogram of the compound-headed NP as produced by UIYTU 216. In contrast with the NB spectrogram which shows the highest prominence and the longest duration on *print-* relative to the other component syllables, the MTC spectrogram does not reflect the expected modulation of pitch and durational contrast between the stressed and the unstressed syllables, given the pitch and duration reading of 263Hz/410ms for *print-* against 258Hz/417ms for the final syllable and 225Hz/148ms for the initial syllable.



Native baseline LTC

Figure 4.56: Native baseline spectrogram of *a printout* compared with sample LTC spectrogram of *a printout* as produced by UIYTU 260

Compared with the NB spectrogram which shows the highest prominence and the longest duration on *print-* relative to the other component syllables, the LTC spectrogram of *a printout* displayed in Figure 4.56 does not reflect the expected modulation of pitch and durational contrast between the stressed and the unstressed syllables. The readings for each syllable reveals that the LTC assigned equivalent prominence to all the syllables, considering the pitch and duration values (228Hz/375ms) obtained for *print-* against 215Hz/370ms for the final syllable and 211Hz/358ms for the initial syllable.

4.5 Intra-group comparison for the performance of the HTC in stress differentiation (compound nouns and phrases) and stress shift (nominal phrases with contiguous strong syllables)

Comparing participants with high, mid and low technology exposure, findings from this study have shown that UIYTUs' approximation to English stress and rhythm increases as technology contact level advances. The HTC, particularly, performed strikingly better than the other TC levels in all the aspects of stress and rhythm examined. However, intra-group performance check drew attention to the performance of UIYTUs with high technology contact in some of the aspects examined. It was observed that their performance in the use of stress to differentiate between compound nouns and phrases, and stress shift required in nominal phrases with contiguous strong syllables was lower than their performance in other aspects. To objectively ascertain this, independent t-tests were conducted on both aspects to establish whether or not there are significant differences between the appropriate and the inappropriate usages. The results are presented in tables and discussed below.

Table 4.76: Independent t-test for HTCs' intra-group performance in the use of stress to differentiate between compound nouns and phrases

Grouping variable (stress differentiation of compound nouns and phrases)	N	Mean	SD	Std. error mean	T	Sig.
Appropriate stress differentiation	5	31.80	2.78	1.24	-.92	.383
Non-differentiation	5	33.60	3.36	1.50		

The mean difference is not significant at the 0.05 level; df = 4.

Table 4.76 shows the result of independent t-test for the HTCs' appropriate stress differentiation and non-differentiation of compound nouns and phrases. Mean of appropriate stress differentiation of the two grammatical units is 31.80 while the mean of non-differentiation is 33.60. The output indicates that there is no significant difference between the realised and the unrealised appropriate stress differentiation of compound nouns and phrases in the speeches of the participants with high technology contact ($\underline{t}$ (4) = -.92, $p < .05$).

Table 4.77: Independent t-test for HTCs' stress shift in noun phrases with contiguous strong syllables

Grouping variable (stress shift in noun phrases with contiguous strong syllables)	N	Mean	SD	Std. error mean	T	Sig.
Appropriate stress shift	2	35.00	1.41	1.00	3.54	.072
Non-shift	2	30.00	1.41	1.00		

The mean difference is not significant at the 0.05 level; df = 2.

The result of independent t-test for the realised and the unrealised stress shift, required to space out stress in noun phrases with contiguous strong syllables, produced by participants with high technology contact is presented in Table 4.77 above. The mean of appropriate stress shift realised is 35.00 while the mean of unrealised stress shift is 30.00. The result reveals that there is no significant difference between the realised and the unrealised stress shift in the speeches of the participants with high technology contact ($\underline{t}$ (2) = 3.54, $p < .05$).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter is a summary of the preceding chapters and the findings from the analyses. It has conclusions based on the findings with recommendations.

5.1 Summary

There are five chapters in this work. Chapter one, the introductory chapter, discusses the background to the study, establishing the importance of the English language in Nigeria for political and socio-economic life opportunities and the preeminence accorded it in formal contexts, particularly the educational domain. Submissions on variety differentiation studies of spoken Nigerian English at the segmental, suprasegmental and the interphase levels were examined. Particular attention was accorded stress and rhythm, being the focus of the study. The chapter also explored scholarly findings which attest to the inability of supposed models of English language in Nigeria, especially teachers of English language, to approximate to Standard British English(Akinjobi, 2011; Akinjobi and Aina, 2014; Aina, 2014, 2017; Adesanya, 2014; Agboyinu, 2018), hence, the problem of access to standard pronunciation for teenage Nigerians and the general users of the English language at large.

The collapse of physical boundaries between native and non-native speakers of English language made possible by the 21st century advancement in information and communication technology (ICT) (Akinjobi, 2015) and how scholarly submissions relating to its impact on spoken English language in Nigeria have only concentrated on its availability, extent of utilisation and prospects for (spoken) English language teaching and learning in Nigeria were also examined. The background section of the chapter is wrapped up with Roach's (2000) assertion that approximation to native pronunciation in a language (the English language in this case) is possible with meaningful communication situations which, in Akinjobi's (2015) opinion, are available through advancement in Information and Communication Technology. This is the premise of the current study.

The chapter further identifies the aim and objectives of the study. The objectives sought to establish (comparing three groups) whether or not University of Ibadan Yoruba teenage undergraduates of a particular technology contact level approximated better than those of the next lower level to Standard English stress and rhythm and their ancillary features. Research questions were drawn and hypotheses were formulated based on the objectives. In addition, the significance of the study to variationist sociolinguistics, the systematic description of Nigerian English phonology and language pedagogy and curriculum planning were highlighted.

In chapter two, a review of relevant literature pertaining to the concepts and ideas of the study, ranging from the syllable as a suprasegmental domain to stress and rhythm and their ancillary features, was done. Scholarly submissions on Nigerian English features at the segmental, suprasegmental and interface levels were also discussed. Works on sociolinguistic studies of spoken English of young Nigerians and technology-based non-enculturation sources of access to Standard English were alsoexamined. A review of the regional variation between Standard British English and General American English was done in the chapter and it was established that, although the greatest variations between the SBE and GA exist at the level of spoken language, the suprasegmental features of both umbrella varieties are quite similar. Exceptions are only found in the stress assignment on a few words that are mostly disyllabic and/or French loanwords. Deliberate attempt was therefore made to avoid such words in the ESRCT administered on the research participants. The chapter further explores acoustic phonetics as the most objective branch of phonetics and is wrapped up with an examination of Labov's (1966) variability theory and Liberman and Prince's (1977) Metrical phonology, adopted as the theoretical framework.

Chapter three focuses on the methodology adopted for the research. This chapter examines the sampling technique and the sample, data gathering technique, method of data collection and data analysis technique. The sampling technique was criterion sampling and the target population was Yoruba teenage undergraduates in the University of Ibadan. The three hundred (300) participants, drawn from the first-year and second-year students of the university, were all Nigerian teenagers of Yoruba origin and L1 speakers of English language stratified only on the basis of their practical knowledge and use of technological facilities through which they access native English. A Briton, born, nurtured and currently living in London, served as the native baseline. To elicit data for analysis, participants were made to read a prepared text into Speech Filing System (SFS/WASP). The data were analysed quantitatively using SPSS version 21 one-way analysis of variance and qualitatively using metrical grids to show the underlying structure of utterances produced by representative participants of each group. Comparative acoustic analysis of the spectrograms of selected words/expressions, produced by the native baseline and the research participants, was done to further verify the results of the statistical and the metrical analyses.

Analyses of elicited data were done in chapter four based on each of the formulated hypotheses, covering aspects of Standard English stress, rhythm and their ancillary features. Three analyses were done for each of the hypotheses- statistical, metrical and acoustic analyses. The statistical analysis revealed the following:

1. The UIYTUs with high technology contact assigned stress to English polysyllabic words better than UIYTUs with mid technology contact who, in turn, assigned stress better than UIYTUs with low technology contact. The influence of technology contact on English polysyllabic word stress assignment was statistically significant as the delayed stress feature of NE, identified by Kujore (1985) and Jowitt (1999), thinned out with an increase in the technology contact level of the teenagers. Hence, the null hypothesis 1 which states that there is no significant difference in the assignment of stress to English polysyllabic words by University of Ibadan Yoruba Teenage Undergraduates (UIYTUs) with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) was rejected.
2. Although the null hypothesis 2 was rejected as significant difference in UIYTUs' use of stress to differentiate between compound nouns and phrases was established, the difference was not significant among all the groups. While UIYTUs with high technology contact distinguished between compound nouns and phrases, using stress, significantly better than the UIYTUs with mid technology contact and UIYTUs with low technology contact, the difference between the performance of UIYTUs with mid technology contact and the UIYTUs with low technology contact showed no significance. The former, however, performed better than the latter. The productions of the MTC and the LTC largely confirms Sunday's (2004) and Ibasanmi's (2013) findings that that stress assignment by educated Nigerian speakers of English language does not reveal any distinction between compound nouns and phrases.
3. The HTC participants assigned nuclear stress to the appropriate syllables of simple sentences significantly better than the MTC. In the same vein, the MTC performed significantly better than the LTC. Since UIYTUs' ability to assign nuclear stress to the appropriate syllables of sentences based on their level of technology exposure was statistically significant, the null hypothesis 3 which states that there is no significant difference in the assignment of nuclear stress to appropriate syllable of English sentences

by UIYTUs with high technology contact (HTC), mid technology contact (MTC) and low technology contact (LTC) was rejected while the alternate hypothesis was retained.

4. UIYTUs' stress reassignment to focused words in order to contrast meanings matched with their technology exposure, thus the rejection of hypothesis 4. The HTC significantly reassigned stress to focused words better than UIYTUs with mid technology contact and UIYTUs with low technology contact. In the same vein, the performance of UIYTUs with mid technology contact was significantly better than that of UIYTUs with low technology contact.
5. Appropriate reduction of vowels in content words, grammatical words and words with syllabic consonants as peak significantly increased in the speeches of University of Ibadan Yoruba Teenage Undergraduates as technology contact level increased. The HTC reduced vowels more significantly than the MTC. The technology exposure of the MTC and the LTC also matched their ability to reduce vowels in all the contexts examined. Null hypothesis 5 was therefore rejected. While the performance of the LTC confirms the findings of Akinjobi (2004, 2009a and b) and Akindele (2011), the performance of the HTC revealed a positive impact of technology on vowel reduction in the speeches of the teenagers. The MTC fluctuated between reduction and erroneous strengthening.
6. UIYTUs with high technology contact (HTC) shifted stress as a result of suffixation and in variable words better than UIYTUs with mid technology contact (MTC) who, in turn, performed better than UIYTUs with low technology contact (LTC). However, the MTC did not perform significantly better than the LTC in the stress shift required when words with iambic feet were followed by stressed syllables. Thus, the speeches of participants of the two categories were characterised by stress clash. The performance of the HTC was significantly better than the other two groups.
7. Segmental elision in the speeches of UIYTUs corresponded with their exposure to technology-based non-enculturation sources of contact with native English as the HTC elided vowels and consonants where necessary significantly better than the MTC. Also, the MTC elided more segments than the LTC. Unlike Oladipupo (2014) which does not reveal any gender or age variation in young Nigerians' usage of Standard British English connected speech processes, of which elision is a part, the performance of the UIYTUs

showed a variation based on their exposure to technology. Their performance prompted the rejection of null hypothesis 7.

8. Although the syllable-timed rhythm already established for NE lexical and phrasal structures (Bamgbose, 1982; Jowitt, 1991; Akinjobi, 2004) reflected in the speeches of the UIYTUs, its occurrence thinned as technology contact level increased. Participants with high technology contact alternated strong and weak syllables better than UIYTUs with mid technology contact. Relative to UIYTUs with low technology contact, there were more occurrences of strong and weak syllable alternation in the productions of the MTC. Null hypothesis 8 was therefore rejected, given the significance in the differences of the UIYTUs' performance.

The metrical grids of the HTC predominantly displayed alternation of strong and weak syllables, while the LTC, more than the MTC, produced adjacent stressed syllables which resulted in stress clashes and non-conformity to SBE rhythm. The LTC and the MTC mainly retained strong/weak (SW) pattern for both noun phrases and compound nouns, while the HTC fairly differentiated them. Appropriate assignment of nuclear stress to the usual and contrastive Designated Terminal Element (DTE) of simple sentences was commensurate with level of technology contact. Strengthening of vowels in metrically weak positions significantly reduced as technology contact level increased. The HTC predominantly reassigned stress where stress shift was required, while the MTC did not reassign stress better than the LTC, especially in contexts where contiguous strong syllables were expected to be resolved by an intervening weak syllable.

The acoustic analysis of the pitch and the duration readings of selected words/ utterances produced by UIYTU reveals that the HTC had the longest duration and the highest pitch frequency and amplitude on stressed syllables. The stress cues of the MTC were sometimes appropriate, while LTC deviated from the standard norm.

5.2 Conclusion

This study examined stress and rhythm and their ancillary features in the English speeches of University of Ibadan Yoruba teenage undergraduates based on their levels of exposure to technological facilities through which they have contact with native English. The study, through the differences established in the productions of the three research groups, has holistically established that Nigerian teenagers' exposure to and use of technology-based non-enculturation sources of native Englishinfluence their proficiency in the use of English stress and rhythm, thereby attesting to Roach's (2000) assertion that approximation to native form of spoken English is attainable if foreign learners are provided with necessary social contact with native speakers. It also validates Akinjobi's (2015) recommendation of non-enculturation sources of contact with native English as means through which non-native speakers of English language such as Nigerians can improve their spoken English. It also further confirms the prospects of Information and Communication Technology (ICT) for (spoken) English language teaching and learning as suggested by Akindele, 2013; Aremu, 2014; Udoh and Egwuchukwu, 2014; Akintunde and Angulu, 2015; Chitulu and Njemanze 2015.

5.3 Recommendations

The study has empirically established that University of Ibadan Yoruba teenage undergraduates' exposure to technological facilities through which native spoken English is accessed wields an influence on their use of Standard English stress and rhythm. Based on the findings of the research, the following recommendations are made:

1 Parents and guardians should realise that technology has already collapsed the walls which separate native and native speakers of the English language and totally transformed the world into a global village. They should, therefore, see the need to equip their children or wards with relevant technological facilities that are capable of creating meaningful communication situations between them and native speakers of English language to enhance their spoken English proficiency.

2 The study established, on the whole, that the higher the level of exposure to technology-based non-enculuration sources of contact with native English, the higher the proficiency displayed by the categories of participants. However, there were instances where the performance of participants with specific technological contacts were not commenserate with their technology exposure. This presupposes that such teenagers, particularly those with high and mid technology contacts either do not realise the potency of these facilities for enhancing their spoken English or they have a negative attitude to appropriate pronunciation. Teenagers to whom the privileges of technology-based non-enculturation sources are already availed are, therefore, enjoined

to develop positive attitude to appropriate pronunciation and exploit such facilities maximally to improve their spoken English rather than as mere instruments of entertainment.

3 Based on Roach's (2000) opinion that adults can also 'pick up' native-like spoken form of a language if they avail themselves native speaker communication situations (which technology-based non-enulturation sources examined in this study has succeeded in providing). Parents and other members of the Nigerian society are encouraged to make deliberate attempt to harness the techological utilities such as electronic media sources (British Broadcasting Corporation (BBC) and Cable Network News (CNN) among others), online English practice sites, social networking sites, computerised speech laboratories like (SFS) WASP, PRAAT, British and American movies, English dictionaries with audio aids, e-dictionaries, pronouncing dictionaries, social media platforms like Facebook, and others suggested by Akinjobi (2015) to enhance their spoken English proficiency.

4 Teachers of English language are,supposedly, models of standard spoken English in Nigeria. However, studies have shown the contrary (Akinjobi, 2011; Akinjobi and Aina, 2014; Aina, 2014, 2018; Adesanya, 2014; Agboyinu, 2018). Teachers of English language are, therefore, advised to take advantage of the non-enculturation sources of native spoken English which technology provides as recommended in Akinjobi (2015) to better their English speeches. These include electronic media, such as British Broadcasting Corporation (BBC) and Cable Network News (CNN) programmes, online English practice sites, social networking sites, computerised speech laboratories like (SFS) WASP, PRAAT, British and American movies, English dictionaries with audio aids, e-dictionaries, pronouncing dictionaries, social media like Facebook, and others. All these will assist the teachers to overcome many difficulties in the use of English, especially, pronunciation problems relating to stress and rhythm.

5 The need to maintain international intelligibility among English language speakers all over the world holds firm. Teaching of phonological concepts to learners should therefore transcend the use of chalk and blackboard or reliance on teachers whose performance, as already estabished, does not model appropriate pronunciation. Language curriculum planning bodies should infuse technological utilities which reveal

the various phonological nuances between English and students' native languages into oral English curriculum. School authorities should ensure the provision and use of such facilities in their schools.

6 Comparing the three TC levels, findings from this study revealed that the higher the technology exposure, the better the UIYTUs' approximation to English stress and rhythm. It was also discovered that the HTC, who conspicuously displayed better pronunciation skill than other TC levels in all the aspects examined, did not perform well (based on intra-group comparison) in two aspects of stress. This is evident in the fact that there were no significant differences in the mean of appropriate forms and the mean of inappropriate forms in both aspects. The aspects in question include the use of stress to distinguish between compound nouns and phrases, and stress shift required to space out stress in noun phrases with contiguous strong syllables. One thing common to both stress types is that they have two stress patterns, either depending on the grammatical designations or the foot type of the word that follows. The teenagers' inability to distinguish both patterns of stress is assumed to be due to the fact that their learning of the patterns is not classroom-structured. They merely have the privilege of knowing the two patterns through technological facilities which enable them to have access to native English. They may, however, not know the functional use of each. Therefore, when teachers of English language choose to use technology-based non-enculturation sources to teach the English suprasegmentals, they should specifically encourage their students to visit online websites where native speakers of English language teach English stress, so that they will be able to differentiate the functions. This is essential because the ability to assign stress is not sufficient. The ability to differentiate functions is also requisite.

5.4 Suggestion for further research

Considering that this study was limited to stress and rhythm, further studies on the influence of teenagers' exposure to technological utilities, through which they access native spoken English, and their English pronunciation at the segmental and the interphase levels and in intonation (a suprasegmental feature is encouraged. Also, the delimitation of the study to Yoruba teenage undergraduates in the University of Ibadan calls for an extension of similar studies to other regions of Nigeria for a more comprehensive conclusion on the influence of technology-based non-enculturation sources of contact with native English on English pronunciation.

It was found out in this study that, on the whole, participants of a particuar technology contact level performed significantly better than the participants of the next lower level. However, there were instances where the performance of some participants, particularly those with mid and high technology contact, were not commensurate with their technology exposure. There were also cases of stress assignment where participants, particularly those with high technology contact (who approximated to Standard English stress and rhythm better than other TC levels) could not (based on intra-group comparison) differentiate some functional stress types. Reasons for these inadequacies have only been assumed, in this study, to be any of the following:

- the teenagers' ignorance of the potency of the technological facilities for their spoken English enhancement
- negative attitude to appropriate pronunciation
- the teenagers' perception of the technology-based non-encuturation sources as mere instruments of entertainment
- the teenagers' learning of the stress patterns (where they encounter challenges) is not classroom-structured

It is, therefore, suggested that further studies which will empirically find out the reason(s) for the non-approximation in the areas discussed above should be carried out.

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APPENDICES

Appendix 1

Participant's Eligibility and Technology Exposure Questionnaire

DEPARTMENT OF ENGLISH

UNIVERSITY OF IBADAN

Dear Respondents,

This research is being carried out in the Department of English of the University of Ibadan.

Kindly note that the information you give will be used for academic purposes only and will be treated with utmost confidentiality.

Thank you for your co-operation.

1. How old are you? ……………………………………………………………….
2. Are you a Nigerian? ☐ Yes ☐ No
3. Were you born in Nigeria? ☐ Yes ☐ No

4. What is your state of origin? …………………………………………………

5. Have you lived in a country where English is spoken as a native language (UK, USA. Canada…)? Yes ☐ No

6. Which of these languages did you speak for the first five years of your life?

☐ Hausa ☐ Igbo ☐ Yoruba ☐ English ☐ Others

7. If your answer to question 6 is **others**, please specify………………………………..

8. Do you have access to cable television (DSTV, GOTV, STARTIMES)? ☐ Yes ☐ No

9. If your answer to question 8 is **yes**, in which of the following places do you have access to cable television? ☐ At home and in school ☐ At home only

☐ In school only ☐ At my friend's house ☐ A viewing centre

10. Which station do you listen to more often for news? ☐ Public local station ☐ Private local station ☐ International news stations-CNN, BBC

11. How frequently do you listen to news on your preferred news stations?

☐ Daily ☐ Weekly ☐ Only on holidays

12. Which of the two boxes below has more of your preferred entertainment stations?

BBC Entertainment	African Magic Yoruba/Hausa/Ibo
Mnet Series	Trybe TV
Mnet Action	Zee Bollywood
Mnet Premier	Sound city
Cartoon Network	Zee World

13. Please tick the box that matches your order of preference.

☐ American, British and Nigerian movies

☐ British, American and Nigerian movies

☐ Nigerian, American and British movies

☐ Nigerian, British and American movies

14. Do you make friends on social media? ☐ Yes ☐ No

15. If yes, how many of your social media friends are native speakers of English language (British, American…)? ☐ None ☐ 1-5 ☐ 6-10 ☐ More than 10

16. Do you make calls to or receive calls from your social media friends who are native speakers of English language? ☐ Yes ☐ No

17. How often do you make calls to or receive calls from your social media friend(s) who are native speakers of English? ☐ Always ☐ Often ☐ Rarely ☐ Not at all

18. Through what channel do you speak with your social media friend(s) who are native speakers of English language? ☐ Whatsapp ☐ Facebook ☐ IMO ☐ Viber ☐ Facetime ☐ Phone call ☐ Others (Specify)…………

19. I understand the spoken English of my friends who are native speakers of English language. ☐ Strongly ag☐e Agr☐ Disa☐e Strongly disagree

20. I try to speak like my friends who are native speakers of English language. ☐ Stronglyagree ☐ Agree ☐ Disagree ☐ Strongly disagree

21. Verbal communication between/ among my friends who are native speakers of English and I have improved my spoken English. Stro☐ly agree Agr☐ Disagree ☐ Strongly di☐ree

22. Do you play interactive computer games (games that communicate with you through commentaries or instructions)? ☐ Yes ☐ No

23. If your answer to question 22 is **yes,** how often do you play the games? ☐ Always ☐ Often ☐ Rarely ☐ Not at all

24. Please indicate your favourite games. ☐ Sports games ☐ Adventure games ☐ Others (specify)…………………………..

25. Specify your favourite sports game. ………………………………………….

26. If you play adventure games, list two open world games and close world games that you enjoy playing.

Open-world games	Close-world games
…………………………….	………………………………………….
…………………………….	………………………………………….

27. I understand the commentaries and/or verbal instructions that accompany the games. ☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

28. I enjoy listening to the commentaries and/or verbal instructions that accompany the games. ☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree ☐

29. I try to imitate the commentator or instructor. Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

30. Listening to the commentator or instructor has affected my spoken English. ☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

31. Do you have access to the internet? ☐ Yes ☐ No

32. If your answer to question 31 is **yes**, please tick the relevant box(es) to indicate place(s) where you have access the internet. ☐ On my phone ☐ At home ☐ In school ☐ My Friend's house ☐ cybercafé ☐ Others (specify)……………..

33. Do you practise English pronunciation on the Internet? ☐ Yes ☐ No

34. How often do you engage in the English pronunciation practice? ☐ Always ☐ Often ☐ Rarely ☐ Not at all

35. Practising English pronunciation on the internet has influenced my spoken English positively. ☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

36. Do you have an audio English dictionary on your phone, laptop, ipad etc.? ☐ Yes ☐ No

37. If your answer to question 36 is **yes,** how often do you use the audio English dictionary on your phone, laptop, ipad etc? Alw☐s Ofte☐ Rar☐ Not ☐ll

38. When you look up a word in the dictionary, how often do you listen to the pronunciation of the word? ☐ Always ☐ Often ☐ Rarely ☐ Not at all

39. I try to pronounce the words as pronounced in the dictionary. ☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

40. The audio dictionary has influenced my spoken English positively. ☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

Appendix 2

English Stress and Rhythm Competence Test

Dear participant,

The text you are about to read is designed to test certain English phenomena. Your voice will be recorded and the audio productions will be used only for research purposes. Please read as naturally as possible. You can take some minutes to acquaint yourself with the text before reading. Start by completing the following sentences with the appropriate information. Thank you.

I am …………………………………….. years old.
My research data number is ……………………………

EXERCISE ONE

Text 1: Produce the following (pairs of) words.

Pedestrian University Conglomerate Congratulation Peculiarity

Climate-climatic Photo-photography Perfect-perfection
Proverb-proverbial Tranquil-tranquility

Text 2

Blackbird is a common European and American bird.
Our ship was guided by the flashing light of a lightship.
We gave him a good send-off before he left for Australia.
The government is accused of a cover-up of events at the demonstration.
There's a printout of the report next to the computer.
Dennis gave me a black bird.
We don't have many passengers. It's a light ship.
I must send off this parcel before the post office closes.
There is no point trying to cover up the mistake.
I will print out the report and give you a copy.

Text 3: Emphasise the appropriate word in the sentences below to suggest the meaning in the bracket in front of each.

That was a great idea. (not just any kind or an unseasoned one)
He bought a black car. (did not hire or steal)
Shewas my friend. (not anymore)
John has a nice suit. (not Maxwell)
Mary saw the officer. (not insult/ she surely did)

EXERCISE TWO

Text 1

There could be a bit of rain at the end of the morning.
You must come over for dinner.
We could talk about it at lunch.
Ask them to come to the party.
There should be some more in the box.
Perhaps he'd deliver the tomatoes and potatoes today.
Dr. Stevens got his secretary some strawberries
Helen is so excited that her daughter can now pronounce uncle, frighten, capital, burden, Carson, muddle, revision, wrestle, and listen correctly.
She's Japanese. She's a Japanese author.
Mary is thirteen. She was thirteen yesterday.
She stopped at the eighteenth kilometre.
Properties are available for sale in North East London.
He's Chinese. He's a Chinese dentist.

Text 2

The children's conduct during the concert was excellent.
She gave me a watch as a present.
Thomas was the main suspect in the crime.
What's that strange object on the top shelf?
The vegetable shop sold only local produce.
I've always wanted to conduct an orchestra.
It's my pleasure to present Dr. Stevens.
I began to suspect her honesty.
Would anyone object if we finish the meeting early?
I have to produce the report by the end of the week.

Text 3 Produce the following words

1.	Attend	character	barracks
2.	Particular	molar	monarch
3.	Intimate	accurate	desolate
4.	Tomorrow	tonight	today
5.	Maggot	carrot	parrot
6.	Potatoes	tomatoes	bolero
7.	Forget	ambassador	opportunity
8.	Settlement	violet	problem
9.	Perhaps	stronger	superman

10. Autumn	support	halibut
11. Bottle	couple	struggle
12. Threaten	sullen	rotten

EXERCISE THREE

Give a short speech of about five sentences on the topic ‘An Ideal Family’.