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AN ACOUSTIC INVESTIGATION OF THE DURATION OF VOWEL NASALIZATION IN GA

Rebecca Atchoi Akpanglo-Nartey

Abstract

Relationship between vowel quality and nasalization has seen a number of investigations in languages with results indicating that the duration of nasalization varies with the quality of vowel. While some of the investigations reported that greater velopharyngeal opening occurs in mid-high and high back vowels in some languages, other investigation results show that low vowels are nasalized with greater velopharyngeal opening than high vowels in some other languages. It has been argued that in vowel nasalization low vowels are preferred because low vowels have longer duration in that long vowels are more likely to be nasalized than short vowels. This study sets out to investigate the relationship between the quality of vowels and nasalization in Ga by using acoustic measures. The study makes use of four native Ga speakers' production of oral and nasal vowels in words. The words were recorded in a carrier frame and was analysed using PRAAT. The results indicate that nasal vowels have longer duration than oral vowels and the nasal part of the nasal vowel is longer in high vowels than it is in the low vowels. Generally, the nasal portion of the nasal vowel has longer duration than the oral portion of the vowel. Also, the Front vowels seem to have longer nasal portions than the back vowels. Another observation from the analysis was that the nasal vowels have higher F1 and F2 values than the oral vowel. Thus, the amount of nasalization in Ga vowels is influenced by the quality of vowel.

Keywords: Nasalization, Nasal, Duration, Acoustic, Formants, PRAAT, Vowel quality

1. Introduction

The aim of this study is to acoustically analyse the oral and nasal vowels of the Ga language. The study investigates the relationship between vowel quality and nasalization in Ga. It investigates the duration and also the quality in terms of first and second formant (F1 and F2) values of Ga oral and nasal vowels. It seeks to do a case study of how the duration of vowels affects vowel nasality. Ga is the language of the Ga people in Accra, the seat of the government of Ghana. It is a Kwa Language in which nasalization and tone are phonemic. It is a tone language which has an inventory of seven phonemic oral vowels. It also has five contrasting nasalized vowels which contrast meaning with changes in tone as well. Thus, Ga uses twelve phonemic vowels: /i/, /e/, /ɛ/, /ɑ/, /ɔ/, /o/, /u/, /ĩ/, /ɛ̃/, /ɑ̃/, /ɔ̃/, /ũ/, which may be used with varying tones in utterances to create different meanings, Akpanglo-Nartey R. (2011). All the oral vowels except the mid front vowel /e/ and mid back vowel /o/, contrast with nasalized counterparts to cause lexical distinctions. The phonemic status of the nasal vowels is evident in the following pairs of Ga words:

Table 1: Phonemic status of Ga nasal vowels

Word	Phonetic transcription	Gloss
shi	**[ʃí]**	to pound
shi	**[ʃ̃í]**	to leave
gbɛ	**[gbɛ́]**	pot
gbɛ	**[gbɛ̃́]**	ethnic mark
ka	**[ká]**	to nail
ka	**[kã́]**	to stir / earthenware bowl
gba	**[gbà]**	narrated

gba	**[gbã̀]**	married
shɔ	**[ʃɔ́]**	to kiss
shɔ	**[ʃhɔ̃́]**	to snatch
kpɔ	**[kpɔ]**	knot
kpo	**[kpɔ̃́]**	to save/rescue
fu	**[fù]**	become mouldy
fu	**[fũ̀]**	to bury/smell

While the majority of the oral vowels may be preceded by any of the consonant phonemes of Ga, phonemic nasal vowels may not be preceded by the consonants /p/, /b/, /l/, /ɹ/, /j/, /ʤ/, /g/, /kp/, and /w/. Aside the phonemic nasal vowels, there is nasalization of vowels that occur when nasal consonants in Ga precede vowels. In other words nasalization spreads rightwards from a nasal consonant onset to the vowel (with the exception of /ɑ/ in **ŋaa** [**ŋà:**] 'advice'. Vowels acquire nasality when preceded by nasal consonants. On the other hand, a vowel followed by a nasal consonant may not be nasalized eg. [**flɛŋ:**] 'sitting on the fence', [**pɛmpɛoo**] 'small'.

In Ga, vowel length is as important as the phonemes in that, duration is phonemic in both the oral and nasalized vowels. The duration of vowels in the syllable distinguishes between words lexically and grammatically in other instances. For instance, **fa** [fà] 'borrow'; **faa** [fà:] 'river or the act of borrowing'; **da** [dà] 'big or grow'; **daa** [dà] 'the act of growing'; **tsa** [tʃà] 'dig out'; **tsaa** [tʃà:] 'the act of digging'. Negation may also be expressed by varying the length of the vowel: for instance, **be** [bé] 'quarreled' but [bé:] 'did not quarrel'; **ye** [jé] 'eat' but [jé:] 'did not eat'.

A nasal vowel is produced by establishing an acoustic coupling between the oral and the nasal tract. This is achieved by lowering the velum to allow air flow through both the oral and the nasal tracts simultaneously. Acoustically nasalization is associated with the reduction in intensity of the first formant due to the addition of the nasal cavity in the production of the vowel. There have been many researches investigating the link between

vowel quality and nasalization with varying results. Al-Bamerni, A. (1983) reports that, greater velopharyngeal opening occurs in mid-high and high back vowels in Gujarati and Hindi. Some of the researchers have concluded that the relationship between vowel height and nasalization is such that low vowels in French are nasalized with greater velopharyngeal opening than high vowels thus concluding that nasalization prefers low vowels over high vowels including Delvaux, P. et al. (2002).

High vowels are said to be nasalized sooner than low vowels because a small degree of velopharyngeal opening can affect the acoustic characteristics of high vowels more than low vowels. Hajek, J. et al. (2000) propose that low vowels are preferred because low vowels have longer duration in that long vowels are more likely to be nasalized than short vowels.

This paper contributes to the discussion on nasalization duration by analysing and describing the oral and nasalized vowels of the Ga language. It examines how vowel quality affects nasalization in Ga and also the duration and intensity of the nasalized vowels. The study answers the questions: how does duration of vowels differentiate between oral and nasal vowel? How does the quality of the vowel affect nasalization in Ga? What is the nature of intensity in the oral and nasal vowels?

2. The Design

This study employs acoustic and qualitative approaches to research in the bid to describe the duration of nasalization in Ga. It uses the acoustic approach which measures physical values of the phenomenon being described. It gives a precise description of the phenomenon using frequency values of formants, intensity and duration of the sounds. The study also used the qualitative approach to research in that it describes the duration of nasalization, looking at the case of Ga.

3. Participants

Data was collected from two male and two female Ga native speakers of ages between 30 and 45 years. These speakers had lived most of their lives in indigenous Ga towns: Teshie, Ga Mashie and Tema. They have no known speech defects or hearing defects. All the speakers are literates in Ga and English languages. They all had their basic education in their native lands and went outside their lands to pursue tertiary education.

4. Data collection

Monosyllabic test words made up of an onset and the oral and nasalized vowel nuclei were recorded in a frame '**kɛɛmɔ…pɛ',** 'say … only'. The test words were written in the Ga orthography. Table 1 above shows all the test words used in the study. A Sony IC recorder and was later acquired on PRAAT at a sampling rate of 41025Khz. The microphone was placed at an angle of about 45 degrees and a distance of about 6 inches from the speakers' lips. The frame with test words were randomized on flash cards and speakers were given 2mins each to familiarize themselves with the test words after which they read the frame presented to them one after another. The speakers read the test words in real sentences and also in the frame in order to help them identify the words especially since tone and nasalization are not marked in Ga orthography. The test words in the frame were said two times each.

In order to avoid variations that may be due to differences in tone, tone factor was held constant. The low tone was used in most of the test words used and where we were unable to get a minimal pair with the low tone, a pair with the high tone was used. For instance, in the case of the vowel /i/, [**fĩ**] and [**fḭ́**] with high tones were included in the test words.

5. Acoustic Analysis

The acoustic analysis was done by generating the formant frequencies of oral and nasal vowels from different points within the utterance. The first two formant frequencies were measured from the 25%, 50% and 75% of the sound spectrogram. Also, the intensity of the sounds was measured at the three points within the sound signal where the formant frequency measures were taken. In addition to these, the duration of each sound was measured by enveloping the sound and measuring its length. Samples of the waveforms and spectrograms of the sounds are shown in figures one and two.

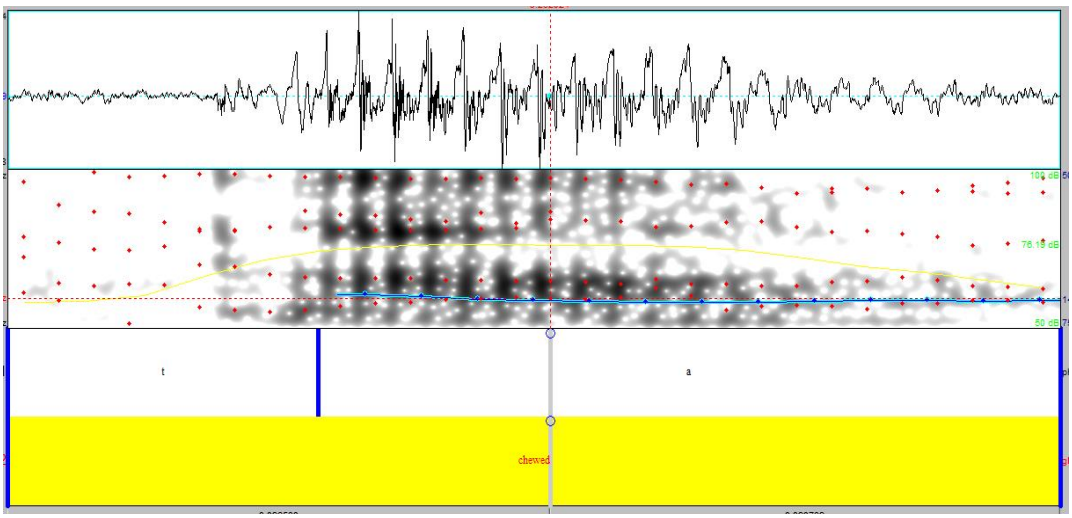

Figure 1: Waveform (top third) and Spectrogram (middle third) of [tà]which shows amplitude on the vertical axis and time on the horizontal axis in the waveform and in the spectrogram, frequency on the vertical axis and time on the horizontal axis.

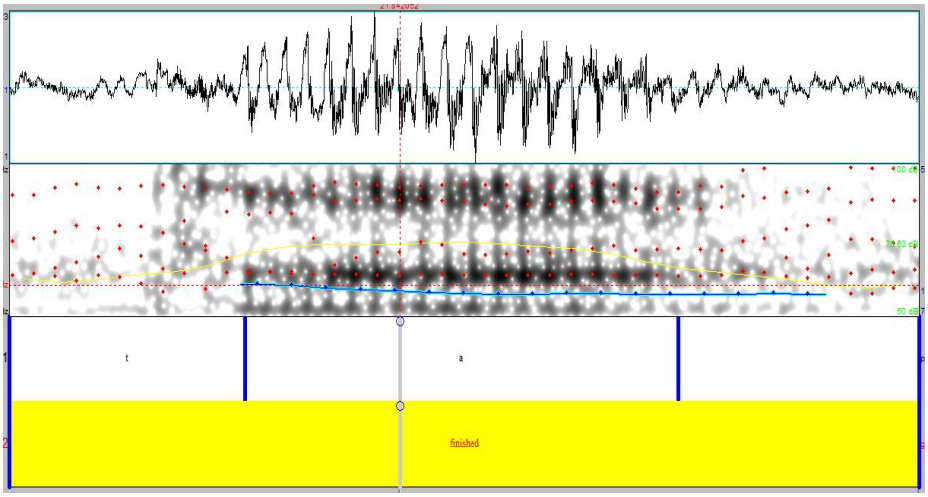

Figure 2: Waveform (top third) and Spectrogram (middle third) of [tà̀] which shows amplitude on the vertical axis and time on the horizontal axis in the waveform and in the spectrogram, frequency on the vertical axis and time on the horizontal axis.

6. Results

The results of this study are discussed in this section. The section discusses the results of the analysis by first of all discussing the duration results then the results of intensity analysis, and then the analysis of formant frequencies.

6.1. Durational Analysis

The data analysis shows that nasal vowels are consistently longer than the oral vowels for all the subjects used. This finding is similar to those of Delattre and Mannot 2009, Lovatto et al 2007, Duez 2006, Jha 1985 Whallen and Beddor 1989, and Manyah 2011. The oral /ɑ/ measures 0.13 seconds and the nasal /ɑ̃/ measures 0.23 seconds for speaker RD where the onset is /b/; with an onset of /t/ the two sounds measured 0.15 and 0.20 seconds respectively; with a /f/ onset they measured 0.13 seconds and 0.18 seconds respectively. When the tones of the words were changed to the high tone, the results showed the same trend for speaker RD: with a /t/ onset /ɑ/and /ɑ̃/sounds measured 0.17 seconds and 0.28 seconds respectively and with a /f/ onset the measures were 0.11 seconds for the oral and 0.22 seconds for the nasal. For the high tone words, the duration of the nasal vowel is almost twice the duration of the oral vowel.

The second speaker AD recorded similar trends as Speaker RD. For this speaker, the oral /ɑ/ with a /b/ onset measured 0.14 seconds while the nasal /ɑ̃/ measured 0.25 seconds. With a /t/ onset the oral /ɑ/ measured 0.13 seconds while the nasal /ɑ̃/ measured 0.20 seconds. With a /f/ onset, the oral /ɑ/ measured 0.13 seconds and the nasal /ɑ̃/ measured 0.17 seconds. With a high tone, the oral /ɑ/ with a /t/ onset measured 0.14 seconds while the nasal /ɑ/ measured 0.29 seconds. With a /f/ onset the oral /ɑ/ measured 0.11 seconds while the nasal measured 0.2 seconds. Again, the duration of the nasal vowel is twice as long as that of the oral vowels.

The duration of the oral and nasal high front vowel /i/ shows that for speaker RD the oral vowel with a /f/ onset measures 0.19 seconds while the nasal vowel measures 0.23 seconds; with a /tʃ/ onset the oral /i/ measured 0.09 seconds while the nasal /i/ measured 0.23 seconds.

Speaker AK recorded an oral /i/ with a /f/ onset that measures 0.09 seconds and a nasal /i/ which measures 0.22 seconds. With a /ʧ/ onset this speaker records an oral /i/ of 0.09 seconds and a nasal /ĩ/ of 0.21 seconds.

These measurements indicate that the nasal vowels measured for the two speakers are twice as long as their corresponding oral vowels.

Measures for the oral and nasal mid front show that nasal /ɛ̃/ is also twice as long as the oral /ɛ/. For speaker RD, the oral /ɛ/ with a /gb/ onset measures0.13 seconds while the nasal counterpart measures 0.24 seconds. For speaker AK, the oral /ɛ/ with a /gb/ onset measures 0.17 seconds while the nasal counterpart measures 0.21 seconds.

The oral and nasal mid back vowel show that nasal /ɔ̃/ is also twice as long as the oral /ɔ/. For speaker RD, the oral /ɔ/ with a /ʃ/ onset measures 0.13 seconds while the nasal counterpart measures 0.24 seconds. With a /f/ onset the oral vowel measured 0.13 seconds while the nasal measured 0.19 seconds. And with a /k/ onset the oral vowel measured 0.1 seconds and the nasal vowel measured 0.24 seconds.

Speaker AK recorded oral /ɔ/ with a /ʃ/ onset that measures 0.11 seconds while the nasal counterpart measures 0.25 seconds. With a /f/ onset the oral vowel measured 0.15 seconds while the nasal measured 0.19 seconds. And with a /k/ onset the oral vowel measured 0.13 seconds and the nasal vowel measured 0.24 seconds.

The study showed that the nasal cues of the vowels in all instances are relatively longer than the oral cues. The only exception to this is in /ɔ̃/ with /k/ and /f/ onsets where the oral cues were longer than the nasal cues. This is shown in Figure 2 below. In Figure 2 the 'X' axis represents the duration while the 'Y' axis represents the vowel type.

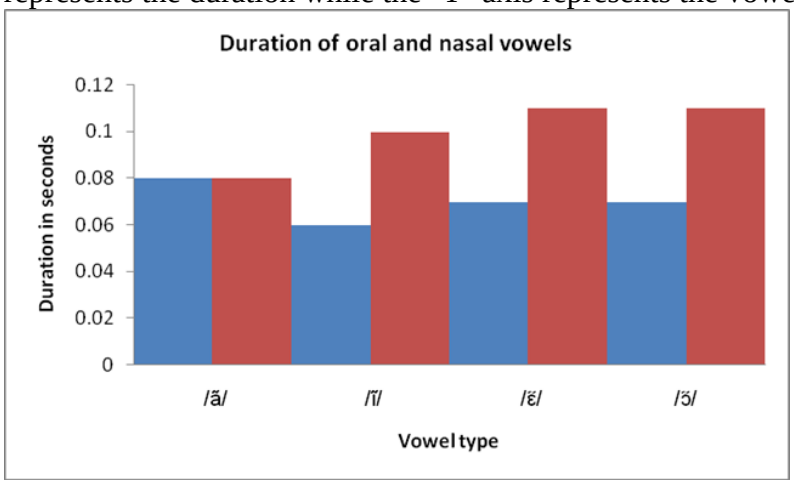

Figure 3: Duration of oral and nasal portions of vowels. The figure shows oral cue of the vowel in blue and the nasal cue in wine. The duration of sounds in seconds is shown on the vertical axis and the vowel types are shown on the horizontal axis.

Averagely, the vowel /ɑ/ for all the speakers shows that the nasal vowel is longer than the oral counterpart by about 0.04 seconds and in the nasal vowel, the nasal portion is longer than the oral portion of the vowel by 0.01 seconds. The vowel /i/ shows similar trends to the vowel /ɑ/ in that the nasal vowel is longer than the oral counterpart by 0.06 seconds, the nasal portion being longer than the oral portion of the nasal vowel by 0.04 seconds. The nasal vowel /ɛ̃/ is longer than the oral counterpart by 0.04 seconds and the nasal portion of it is longer than the oral portion by 0.04 seconds. Similarly, the nasal vowel /ɔ̃/ is longer than the oral vowel by 0.03 seconds and the nasal portion is longer than the oral by 0.04 seconds.

It is realized from the analysis that the duration of the nasal vowel is longest for the mid front vowel, followed by the low back vowel and the mid back vowel. Nasalization is shortest for the mid back vowel which shows the smallest variation (0.03 seconds) between the duration of the oral and the nasal vowel. The analysis indicates that the nasal cues are longer than the oral. The nasal duration of the low vowel is shortest (0.01 seconds) compared to the other vowels where the duration of the nasal portion is about 0.04 seconds.

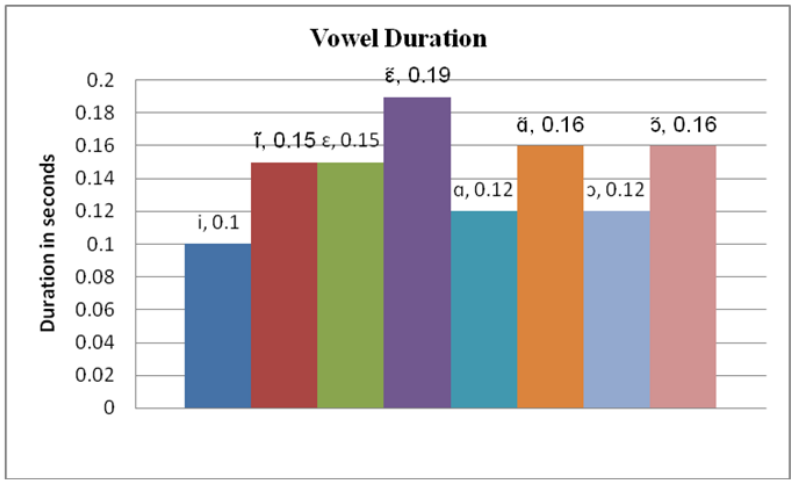

Figure 4: Average duration of oral and nasal cues of vowels. The duration of sounds is shown in seconds on the vertical axis and the vowel types are shown on the horizontal axis.

In a Consonant Vowel (CV) environment the consonants before both the oral and the nasal vowel are relatively shorter than the vowels. The length of the consonant does not seem to be affected by the nasality of the following vowel because there are instances in the data where the consonants are equal in duration for the oral and nasal vowel: in **ba** [bɑ́] the consonant duration is 0.08 seconds; in **fa** [fɑ́] the consonant duration is 0.17 seconds. In other instances, the consonant duration is longer before the nasal vowel than before the oral vowel while in other instances the reverse is true. Thus, the relationship between nasality and consonant duration for the onset is not established in this data.

6.2. Analysis of Intensity

The intensity for /ɑ/ at the 25% point is 77dB. This decreased by the 50% point to 74dB and to 69dB. The nasal started with an intensity of 78dB which decreased to 75dB and to 72dB. /i/ at the 25% point has an intensity of 77dB and this came to 76dB and to 75dB. The nasal /ĩ/ started with 78dB and reduced to 77dB and to 75dB. /ɛ/ has an intensity of 81dB which dipped to 79dB and to 76dB. The nasal /ɛ̃/ starts with 82dB and fell to 81dB and to 62dB. The sound /ɔ/ at the 25% point has an intensity of 80dB which fell to 78dB and to 74dB. The nasal /ɔ̃/ at the 25% point measured 79dB in intensity and this fell to 77dB and to 71dB.

6.3. Analysis of Formants

The analysis of Formants was done by looking at the trends in the first formant frequency (F1) and then the second formant frequency (F2) of the participants. The measures were taken from the 25%, 50% and 75% points (i.e. The first third, the midpoint and the final third) within the utterance.

6.3.1. F1 measurements

For speaker RD, F1 for the oral /ɑ/ rises gradually from 715Hz through 766Hz to 779Hz while the nasal /ɑ̃/ started with 523Hz at the 25% point of utterance and by the 50% point F1 had reduced to 449Hz which further reduced to 367Hz by the 75% point of utterance. Thus, the nasal vowel /ɑ̃/ has relatively lower F1 at the various points than the oral vowel /ɑ̃/.

F1 for /i/ at the point 25% measured 323Hz and reduced to 315Hz at the 50% point and then to 281Hz at the 75% point of the vowel. For the nasal counterpart /ĩ/ F1 measured 365Hz at 25% and reduced to 201Hz at 50% and to 196Hz at 75%. The nasal of /i/ therefore has a relatively higher F1 value than the oral counterpart. It however reduced to a value lower than the oral by the end of the sound.

The vowel /ɛ/ for speaker RD measured 512Hz at 25% and this dipped to 498Hz by the 50% and then dipped further to 426Hz by the 75% point. /ɛ̃/ measured 511Hz at 25%, dipped to 342Hz at 50% and to 266Hz at the 70% point. The nasal /ɛ̃/ has relatively lower F1 values than the oral counterpart throughout the sound. The vowel /ɔ/ is 528Hz at 25% but dips like other vowels to 497Hz at 50% and to 498Hz at 75%. /ɔ̃/ starts with 504Hz at 25%, dips to 447Hz at the midpoint and then 386Hz at 75%. The nasal /ɔ̃/ like the other nasal sounds has a relatively lower F1 values than the oral /ɔ/.

For speaker AK, /ɑ/ starts with 697Hz at 25% then rises to 770Hz at the midpoint and again rises to 779Hz by the 75%. The nasal /ɑ̃/ starts with a lower F1 of 508Hz at 25% and then dips to 429Hz by the midpoint and dips again to 409Hz at the 75% point. The figures show relatively lower F1 values for the nasal sound.

The vowel /ɛ/ for this speaker measured 471Hz at 25% but dips to 451Hz by the midpoint and rises to 474Hz. The nasal /ɛ̃/ measured 380Hz which was reduced by the midpoint, to 365Hz. It again dipped to 340Hz by the 75% point.

The /i/ sound measured 321Hz at the 25% point and this fell to 306Hz by the 50% point and then to 307Hz by the 75% point of the sound. The nasal /ĩ/ measured 396Hz at 25% and reduced to 328Hz at 50% and reduced again to 296Hz. The nasal /ĩ/ unlike other nasals for speaker AK has relatively higher F1 values than the values for the oral.

Sound /ɔ/ has F1 value of 549Hz at the 25% point of the sound and the value reduced to 501Hz by the midpoint of the sound. The value then increased to 529Hz by the 75% point of the sound. The nasal /ɔ̃/ started with a relatively higher F1 of 562Hz but dips to 463Hz at the midpoint and then to 411Hz by the 75% point of the sound.

F1 for speaker NA, /ɑ/ increased gradually from 661Hz through 673Hz at the midpoint and the value here is maintained at the 75% point in the sound. The nasal /ɑ̃/ started with a relatively lower F1 of 620Hz at the 25% point of utterance and by the 50% point F1 had increased to 680Hz which is higher than the F1 value of the oral /ɑ/. F1 further increased to 701Hz by the 75% point of utterance. Thus, the nasal vowel /ɑ̃/ has relatively higher F1 values on the average than the oral counterpart.

The /i/ vowel sound measured 379Hz at the point 25% and increased to 398Hz at the 50% point and then decreased to 355Hz at the 75% point of the vowel. For the nasal

counterpart /ĩ/ F1 measured 351Hz at 25% and increased 356Hz at 50% and decreased again to 270Hz at 75%. The nasal of /i/ therefore has relatively lower F1 values than the oral counterpart.

The vowel /ɛ/ for speaker NA measured 404Hz at 25% and this increased to 530Hz by the 50% and then to 605Hz by the 75% point. /ɛ̃/ measured 506Hz at 25%, dipped to 487Hz at 50% and then to 376Hz at the 70% point. The nasal /ɛ̃/ has relatively lower F1 values at the 50% and 75% points of the sound than the oral counterpart but higher F1 at the 25%.

The vowel sound /ɔ/ for this speaker has F1 of 551Hz at 25% which increases to 579Hz at 50% and then to 576Hz at 75%. /ɔ̃/ starts with 584Hz at 25%, dips to 537Hz at the midpoint and then to 453Hz at 75%. The nasal /ɔ̃/ has a higher F1 value at 25% than the oral counterpart but has relatively lower values at the 50% and 75% points of the sound.

Speaker AJ's, /ɑ/ starts with F1 of 658Hz at 25% then rises to 731Hz at the midpoint and again rises to 777Hz by the 75%. The nasal /ɑ̃/ starts with a lower F1 of 589Hz at 25% and then dips to 555Hz by the midpoint and dips again to 414Hz at the 75% point. The figures show relatively lower F1 values for the nasal sound.

/ɛ/ vowel sound for this speaker measured 451Hz at 25% but dips to 430Hz by the midpoint and to 428Hz. The nasal /ɛ̃/ measured 487Hz which was reduced by the midpoint, to 477Hz. It again dipped to 337Hz by the 75% point. At the 25% and 50% points of the sound, the nasal /ɛ̃/ has relatively higher F1 values than the oral counterpart.

Sound /i/ has F2 of 358Hz at the 25% point and this fell to 331Hz by the 50% point and then increased to 377Hz by the 75% point of the sound. The nasal /ĩ/ measured 380Hz at 25% and reduced to 302Hz at 50% and reduced again to 290Hz. The nasal /ĩ/ has relatively higher F1 values at the 25% point than the F1 value for the oral.

The vowel /ɔ/ has F1 value of 526Hz at the 25% point of the sound and the value increased to 528Hz by the midpoint of the sound. The value then increased again to 550Hz by the 75% of the sound. The nasal /ɔ̃/ started with a relatively lower F1 of 507Hz then increased to 527Hz at the midpoint and then decreased to 460Hz by the 75% point of the sound.

Table 2: F1 Percentages for Vowels

		F1	
vowel	25%	50%	75%
/a/	683	735	752
/ã/	560	529	473
/i/	345	337	330
/ĩ/	320	307	284
/ɛ/	484	475	483
/ɛ̃/	471	418	305
/ɔ/	539	501	538
/ɔ̃/	530	494	430

The average F1 values for all the speakers are plotted in Figures 5, 6, 7, and 8, which show the relationships between the oral vowels and their nasal counterparts. As shown in Figure 5 the oral /i/ vowel starts with F1 of 345Hz and falls slightly to 337Hz and then to 330Hz. The difference between the frequencies at the 25% point and the 50% point is 8Hz and the difference between the 75% point and the 50% point is 7Hz. With the nasal vowel /ĩ/ however the difference between the 50% and the 25% point is 13Hz and the difference between the 75% point and the 25% point is 23Hz. Therefore, the F1 for the nasal vowel has a steeper slope compared with that of the oral vowel /i/. Generally, the nasal vowel shows lower F1 values than the oral vowel. Thus, nasalizing the vowel /i/ is an indication of lowered F1.

The vowel /ɛ/ shows similar F1 movement through the utterance as /i/. The oral vowel shows F1 of 484Hz and about 9Hz higher at the 25% point than the 50% point and the 50% point shows about 8Hz lower value than the value at the 75%. Like the /i/ and /ĩ/ vowels, the nasal /ɛ̃/ has lower F1 values than the oral /ɛ/but the difference at the 75% point is even bigger (78Hz) and this is shown in the slope of F1 chart in Figure 6.

The vowels /ɑ/ and /ɑ̃/ show higher F1 values for /ɑ/ than for /ɑ̃/. Whereas /ɑ/ starts with 683Hz the nasal /ɑ̃/starts with 560Hz, a difference of 123Hz at the 25% point. At the 50% point, there is a difference of 206Hz and a difference of 279Hz at the 75% point. While the oral vowel F1 is rising for this vowel, it is falling for the nasal counterpart.

The vowels /ɔ/ and /ɔ̃/ show higher F1 values for /ɔ/ than for /ɔ̃/. Whereas /ɔ/ starts with 539Hz the nasal /ɔ̃/ starts with 530Hz, a difference of 9Hz at the 25% point. At the 50% point, there is a difference of 7Hz and a difference of 8Hz at the 75% point. The nasal vowel F1 falls through the utterance with a difference of 36Hz between the 25% and 50% and a difference of 64Hz between the 50% and the 75% points. This shows a significant drop as shown in Figure 8.

The values for F1 between the oral vowels and their nasal counterparts show that the nasal vowels have lower values than the oral vowels. Also, the nasal vowels have F1 values which fall significantly through the 25%, 50% and 75% points in the vowels.

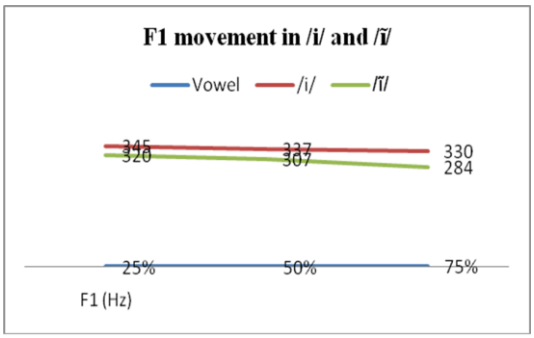

Figure 5: F1 for /i/ and /ĩ/

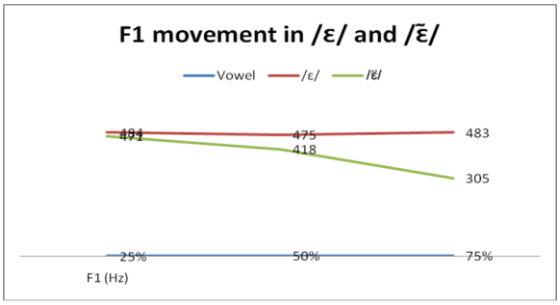

Figure 6: F1 for /ɛ/ and /ɛ̃/

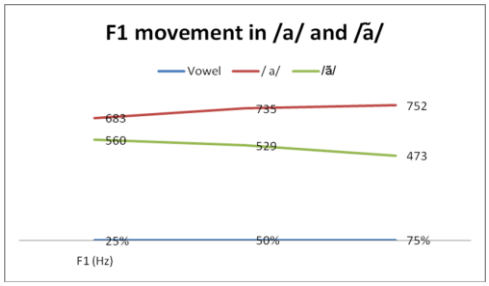

Figure 7: F1 for /ɑ/ and /ɑ̃/

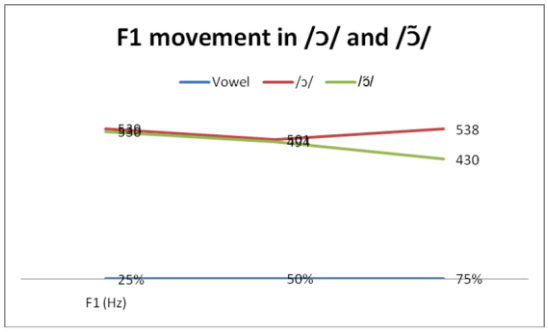

Figure 8: F1 for /ɔ/ and /ɔ̃/

6.3.2. F2 Measurements

The Second Formant (F2) frequency for each of the sounds under discussion was measured from the first third, halfway and the last third of the sound signal.

Speaker RD, F2 for the oral /ɑ/ rises gradually from 1585Hz through 1657Hz to 1724Hz while the nasal /ɑ̃/ started with 1372Hz at the 25% point of utterance and by the 50% point F1 had reduced to 1340Hz which further reduced to 1327Hz by the 75% point of utterance. Thus, the nasal vowel /ɑ̃/ has relatively lower F2 at the 25%, 50% and 75% points than the oral vowel/ɑ/.

The vowel /i/ at the point 25% measured 1916Hz and reduced to 1722Hz at the 50% point and then to 1717Hz at the 75% point of the vowel. For the nasal counterpart /ĩ/ F2 measured 1873Hz at 25% and reduced to 1569Hz at 50% and to 1492Hz at 75%.

The vowel /ɛ/ for speaker RD measured 2049Hz at 25% and this rose to 2078Hz by the 50% and then dipped to 2047Hz by the 75% point. /ɛ̃/ measured 1995Hz at 25%, rose to 2027Hz at 50% and to 1678Hz at the 70% point. The nasal /ɛ̃/ has relatively lower F2 values than the oral counterpart throughout the sound.

The vowel /ɔ/ is 528Hz at 25% but dips like other vowels to 497Hz at 50% and to 498Hz at 75%. /ɔ̃/ starts with 1266Hz at 25%, dips to 1163Hz at the midpoint and then 1269Hz at 75%. The nasal /ɔ̃/ has a relatively higher F2 values than the oral. It starts with 1420Hz at 25% and is reduced to 1260Hz at 50% is increased again to 1413Hz at the 75% point.

For speaker AK, F2 for /ɑ/ starts with 1423Hz at 25% then rises to 1522Hz at the midpoint and decreases to 1468Hz by the 75%. The nasal /ɑ̃/ starts with a lower F2 of 1353Hz at 25% and then dips to 1253Hz by the midpoint and rises to 1283Hz at the75% point.

The vowel /ɛ/ measured 1829Hz which was raised by the midpoint, to 2030Hz. It again increased to 2225Hz by the 75% point. The nasal /ɛ̃/ for this speaker measured F2 of 1633Hz at 25% which dips to 1436Hz by the midpoint and rises to 1521Hz.

F2 for the vowel /i/ measured 1925Hz at the 25% point and this fell to 1919Hz by the 50% point and then to 1886Hz by the 75% point of the sound. The nasal /ĩ/ measured 1935Hz at 25% and reduced to 1872Hz at 50% and reduced again to 1849Hz at 75%.

The vowel /ɔ/ has F2 value of 1392Hz at the 25% point of the sound and the value reduced to 1265Hz by the midpoint of the sound. The value then increased to 1355Hz by the 75% of the sound. The nasal /ɔ̃/ started with a relatively higher F2 of 1430Hz but dips to 1423Hz at the midpoint and then to 1362Hz by the 75% point of the sound.

F2 for speaker NA, /ɑ/ increased gradually from 1328Hz through 1368Hz at the midpoint to 1392 at the 75% point in the sound. The nasal /ɑ̃/ started with a relatively lower F2 of 1143Hz at the 25% point of utterance and by the 50% point F2 had increased to 1147Hz. F2 further increased to 1305Hz by the 75% point of utterance.

The vowel /i/ measured 1328Hz at the point 25% and increased to 1367Hz at the 50% point and then increased to 1392Hz at the 75% point of the vowel. For the nasal counterpart /ĩ/ F2 measured 2257Hz at 25% and decreased to 2172Hz at 50% and decreased again to 2054Hz at 75%. The vowel /ɛ/ for speaker NA measured 1291Hz at 25% and this increased to 1622Hz by the 50% and then to 1666Hz by the 75% point.

/ɛ̃/ measured 1463Hz at 25%, increased to 1713Hz at 50% and then to 1775Hz at the 70% point. The vowel /ɔ/ is 1035Hz at 25% but dipped to 899Hz at 50% and then to 888Hz at 75%. /ɔ̃/ starts with 979Hz at 25%, increases to 1038Hz at the midpoint and then dips to 907Hz at 75%.

Speaker AJ's, /ɑ/ starts with F2 of 1392Hz at 25% then rises to 1488Hz at the midpoint and again rises to 1537Hz by the 75% point. The nasal /ɑ̃/ starts with a lower F2 of 1284Hz at 25% and then rises to 1361Hz by the midpoint and rises again to 1435Hz at the 75% point. The figures show relatively lower F2 values for the nasal sound.

The F2 for vowel /ɛ/ for this speaker measured 1630Hz at 25% which rises to 1772Hz by the midpoint and then to 1790Hz by the 75% point. F2 for the nasal /ɛ̃/ measured 1701Hz at the 25% point and this rose to 1899 by the midpoint, and to 2044Hz by the 75% point.

The vowel /i/ F2 measured 1992Hz at the 25% point and this fell to 1988Hz by the 50% point and then to 1937Hz by the 75% point of the sound. The nasal /ĩ/ F2 measured 2114Hz at 25% and reduced to 2035Hz at 50% and then rose to 2050Hz.

The vowel /ɔ/ has F2 value of 969Hz at the 25% point of the sound and the value decreased to 918Hz by the midpoint of the sound and then to 917Hz by the 75% point of the sound. The nasal /ɔ̃/ started with a relatively lower F2 of 1033Hz then decreased to 976Hz at the midpoint and then to 950Hz by the 75% point of the sound.

Table 3: F2 Vowel Percentages

	F2		
Vowel	25%	50%	75%
/ɑ/	1507	1509	1530
/ɑ̃/	1288	1275	1337

/i/	1973	1923	1999
/ĩ/	**1845**	**1875**	**1829**
/ɛ/	**1774**	**1875**	**1932**
/ɛ̃/	1698	1769	1705
/ɔ/	1166	1061	1107
/ɔ̃/	1216	1174	1158

The average F2 values for all the speakers are plotted in Figures 9, 10, 11, and 12, which show the relationships between the oral vowels and their nasal counterparts. Figure 9 shows F2 values for the oral /i/ vowel which starts with 1973Hz and falls slightly to 1923Hz and then rises to 1999Hz. The F2 for the nasal vowel /ĩ/ is lower at the 25% (1845Hz) and this rose slightly to 1875Hz and then fell again to 1829Hz. Generally, the nasal vowel shows lower F2 values than the oral vowel. Thus, nasalizing the vowel /i/ brings about lowered F2.

The vowel /ɛ/ shows similar F2 movement through the utterance as /i/. The oral vowel shows F2 of 1774Hz at the 25% point and this rose to 1875Hz and then dipped to 1829Hz at the 75% point. Like the /i/ and /ĩ/ vowels, the nasal /ɛ̃/ has significantly lower F2 values than the oral /ɛ/ and this is clear in Figure 10.

Figure 11 shows the graph F2 values for the vowels /ɑ/ and /ɑ̃/. As is shown the oral /ɑ/ has higher F2 values than the nasal/ɑ̃/. Whereas /ɑ/ starts with 1507Hz the nasal starts with 1288Hz, a difference of 219Hz at the 25% point. At the 50% point, there is a difference of 234Hz and a difference of 293Hz at the 75% point between the oral and the nasal.

The vowels /ɔ/ and /ɔ̃/ unlike other vowels discussed show higher F2 values for/ɔ̃/ than /ɔ/. Whereas /ɔ/ starts with 1166Hz the nasal /ɔ̃/ starts with 1216Hz, a difference of 50Hz at the 25% point. At the 50% point, there is a difference of 113Hz and a difference of 51Hz at the 75% point.

The values for F2 between the oral vowels and their nasal counterparts show that the nasal vowels have lower values than the oral vowels except with the vowels /ɔ/ and /ɔ̃/.

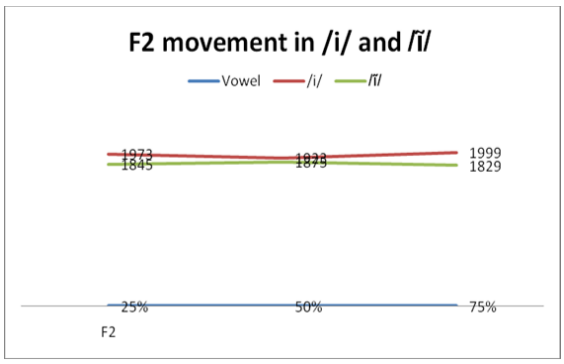

Figure 9: F2 of /i/ and /ĩ/

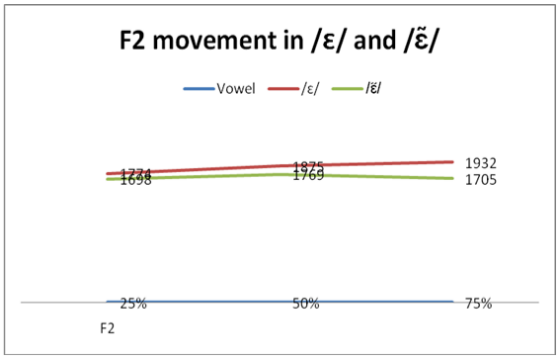

Figure 10: F2 of /ɛ/ and /ɛ̃/

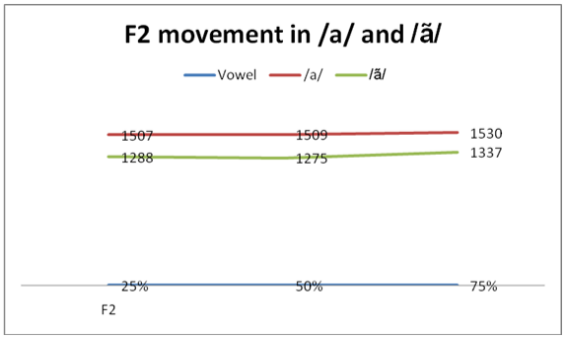

Figure 11: F2 of /ɑ/ and /ɑ̃/

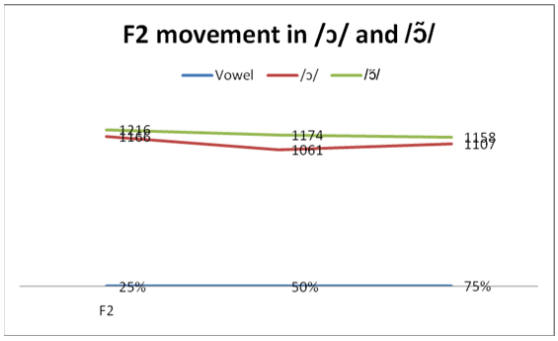

Figure 12: F2 of /ɔ/ and /ɔ̃/

7. Discussion and Conclusion

This study aimed at investigating the duration effect of nasalization in Ga vowels. It is also to find how the nasal vowels differ acoustically from the oral vowels in terms of frequency and intensity. The finding of the study is to be a contribution to discussions on vowel nasalization on languages.

7.1. The Duration of Nasalization

Although observations made from the results of this study are solely on absolute values, it is evident that nasalization in all instances is very long in the sense that the nasal cues of the vowels are relatively longer than the oral cues. The only exception to this is in /ɔ̃/ with /k/ and /f/ onsets where the oral cues were longer than the nasal cues. The nasal vowel /ã/ is longer than the oral counterpart by about 0.04 seconds and in the nasal vowel, the nasal portion is longer than the oral portion of the vowel by 0.01 seconds. Similarly, the nasal vowel is longer than the oral counterpart by 0.06 seconds, the nasal portion being longer than the oral portion of the nasal vowel by 0.04 seconds. The nasal vowel /ɛ̃/ is longer than the oral counterpart by 0.04 seconds and the nasal portion of it is longer than the oral portion by 0.04 seconds. Similarly, the nasal vowel /ɔ̃/ is longer than the oral vowel by 0.03 seconds and the nasal portion is longer than the oral by 0.04 seconds.

It is realized from the analysis that the duration of the nasal vowel is longest for the high front vowel, though the high front vowel is not the longest vowel produced by the respondents. In fact, the high front vowel seems to be the shortest vowel produced i.e. 0.1 seconds. The mid front vowel is relatively longer than all the other vowels (0.15 seconds) but nasalization in this vowel is not as long as that of the high front vowel. The duration of nasalization of the mid front vowel is second to that of the high front vowel in length and is followed the low central vowel /ɑ/. Nasalization is shortest for the mid back vowel which shows the smallest variation (30 milliseconds) between the duration of the oral and the nasal vowel. The oral and nasal portions of the nasal vowels show that the nasal portions are longer than the oral. The nasal duration of the low vowel is shortest (10 milliseconds) compared to the other vowels where the duration of the nasal portion is about 0.04 seconds and this is in contrast with what Hajek, J. and Maeda, S. (2000) and Delvaux P. et al (2002) reported in French that low vowels are more likely to be nasalized.

In a Consonant Vowel (CV) environment the consonant before both the oral and the nasal vowel are relatively shorter than the vowels. The length of the consonant does not seem to be affected by the nasality of the following vowel because there are instances in the data where the consonants are equal in duration for the oral and nasal vowel: in **ba** [bã] the consonant duration is 0.08 seconds; in **fa** [fã] the consonant duration is 0.17 seconds. In other instances, the consonant duration is longer before the nasal vowel than before the oral vowel while in other instances the reverse is true. Thus, the relationship between nasality and consonant duration for the onset is not established in this data.

The intensity values from the data indicate that the nasal vowels have slightly higher intensities than the oral vowels except for the mid back vowel where the oral vowel has a relatively higher intensity than the nasal. In all cases, the intensity was high at the 25% and by the 75% point the intensity is reduced. Thus, intensity is a cue to the oral/nasal contrast in the vowels of Ga.

The values for F1 between the oral vowels and their nasal counterparts show that the nasal vowels have lower values than the oral vowels. Also, the nasal vowels have F1 values which fall significantly through the 25%, 50% and 75% points in the vowels. This is also true for the F2 values of all the vowels except the mid back vowel. This indicates that while the nasalized front vowels are made less front than the oral counterparts, the nasalized mid back vowel is made less back than the oral counterpart. Also, the nasal vowels are made with a slightly higher tongue height than their oral counterparts.

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CONSONANT SEQUENCE REDUCTION IN CHILD PHONOLOGY

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Abstract

This article describes consonant sequence reduction in the speech of four children acquiring Yoruba and English concurrently. It is argued that the two children acquiring English primarily and Yoruba secondarily simply delete the most sonorous members of consonant sequences in a manner consistent with the sonority hierarchy, but the children acquiring Yoruba primarily and English secondarily reduce consonant sequences through coalescence. This is apparent in sequences containing sonorants plus voiceless obstruents as inputs, but which consistently have only the voiced counterpart of the input obstruent in the output. We argue that the voicing of the underlyingly voiceless obstruents in this case is from the input sonorant. It is also reported that where the child's primary language is Yoruba, mastery of consonant sequences is slower than where it is English. It is argued that this is because these sequences are limited to only homorganic nasal plus a following consonant in Yoruba, whereas clusters are more frequently encountered in English.

Key words: consonant sequence, homorganic nasal, coalescence, obstruents, sonority hierarchy

0. Introduction

In the acquisition of the sound system of a language, it is established that the articulatory organs of children master different sounds at different stages and ages. Thus, a child acquiring Yoruba will usually master glottal sounds long before velar, as well as stops before fricatives among others (Adeniyi 2015a). The implication of this sequential acquisition of sounds is that a child is prone to employ different phonological processes, some of which may be novel, to cope with those sounds he/she is yet to master. Since many individual sounds present different children with different degrees of difficulty at each stage of acquisition, situating such difficult sounds within the contexts of other sounds may be even more challenging. This is because these

developmental difficulties are attributable to different factors including perception, production, and grammar (Rose and Inkelas 2011). In terms of perception, the inability of children to effectively sift speech sounds from the noise around them as well as their inability to process every relevant articulatory cue they hear may result in inadequate perception, which in turn informs how they speak. In terms of the place of production in children's developmental difficulties, it is apparent that their vocal tracts are not yet as developed as those of adults, hence their inability to configure their articulators for proper articulation of certain complex sounds or sound sequences. And regarding the role of grammar, the phonology-grammar interface implies that the phonetic realisation of sounds is sometimes conditioned by the grammatical environment such as word-final devoicing in German, and children are prone to have difficulties with these at early stages of their language acquisition.

In this article, we examine how four children acquiring Yoruba and English concurrently handle these developmental difficulties, particularly those relating to consonant sequences. Regarding the reduction of consonant sequences, detailed input structures such as word-initial consonant clusters are not mastered at early stages of acquisition (Goad and Rose 2001); beyond this, little is known (Demuth 2011:582). We therefore argue in this article that Yoruba-speaking children more often adopt coalescence in their reduction of consonant sequences.

In the remainder of this article, we shall first present brief outlines of the relevant aspects of the phonologies of Standard Yoruba and Nigerian English. Since a published work exists on one of the children, we also supply the sound system of the child as an approximation of child phonology in this context. In section 2, we outline our research method, and present as well as discuss our data in section 3. Section 4 contains a summary of findings while the work is concluded in section 5.

1. Background to the Study

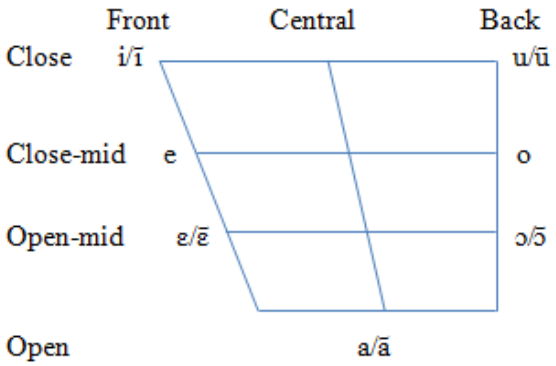
1.1 Yoruba

Yoruba is a West Benue-Congo language spoken predominantly in south-western Nigeria. Yoruba has many dialects, but the standard variety, which is the written form is the form recognised in education and to which speakers approximate when speaking in the public domain. Standard Yoruba (SY) has 18 consonant sounds, seven oral vowels and five underlyingly nasal vowels (Tables 1a-b).

Table 1a: Consonant phonemes of Standard Yoruba

	Labial	Alveolar	Palatal	Velar	Labial-Velar	Glottal
Nasal stops	m	n				
Oral stops		t d	dʒ	k g	k͡p g͡b	
		r				
Fricatives	f	s	ʃ			h
Approximants		l	j		w	

Table 1b: Vowel phonemes of Standard Yoruba



Yoruba operates three level tones, High (´), Mid (usually left unmarked), and Low (`), and two contour tones Rising (ˇ), and Falling (ˆ) (Bamgbose 1990, Akinlabi 2004). The rising contour is the allophonic realisation of the high tone when it occurs after a low tone, while the falling contour is the allophonic realisation of the low tone when it occurs after a high tone. In addition, Yoruba has the phenomena of downdrift and downstep, which make its tone system terraced-level in nature (Laniran and Clements 2003, Adeniyi 2009).

Yoruba syllables are generally of three types: V, CV, and the N. The V type is usually one of a vowel standing alone as a morpheme or a vowel occurring in the prefix position of a noun. The CV type comprises an onset consonant plus a nucleus vowel, while the N type is a syllabic nasal consonant. Of the consonants of Yoruba, /n/ is capable of serving as syllable peak, in which case it bears its own tone. When the /n/ is syllabic, its place of articulation conforms to that of the consonant following it (Akinlabi 2004: 459), whether the following consonant is in the same word with it or in another word. Yoruba does not permit closed syllables; neither does it permit consonant clusters within the same syllable. The only instances of consonant sequences

in Yoruba involve homorganic syllabic nasals (which serve as peaks of their own syllables) followed by the onset consonants of following syllables. Examples of this in lexical items include *k͡pándā* "inferior material," *ōntè* "stamp," while phrasal examples include *ń lɔ̄* "is going." As can be seen in these examples, the syllabic nasal has its own tone, which may be different from the tone of adjacent syllables. The fact that the syllabic nasal takes its own tone in a language having the syllable as tone-bearing unit, already implies that it cannot be regarded as part of any other syllable.

1.2 Nigerian English (NE)

Many Nigerians, including Yoruba speakers, are bilingual in English due to the fact that Nigeria was colonised by Britain, and English became her official language as a result. However, English spoken in Nigeria has a lot of inputs from Nigerian languages; hence the term "Nigerian English" (Jowitt 1991). The implication of this is that there are as many varieties of Nigerian English as the number of languages indigenous to Nigeria. Consequently, the Nigerian English discussed in this article is essentially that influenced by Yoruba, hence NEY.

Since NEY is based on the Yoruba language, it is heavily influenced by the tonal patterns of Yoruba. Jibril (1982) emphasised that "Nigerians perceive and internalise English rhythm in terms of their own tonal systems". The segmental phonemes of NEY are outlined in Tables (2-3) below,

Table 2a: Vowels of NEY, adapted from Jowitt (1991)

S/N	NEY Sound	Corresponding RP form	Example words
1	/i/	/ɪ, iː/	pit, sheep
2	/ɛ/	/e, ɜː/	pet
3	/a/	/a/	cat
4	/ɔ/	/ʌ, ɒ, ɔː, ə, ɔə/	money, cut, actor
5	/u/	/ʊ, uː/	put
6	/e/	/ei/	say
7	/ai/	/aɪ/	sky
8	/ɔi/	/ɔɪ/	toy
9	/o/	/əʊ/	soul, bowl
10	/ao/	/aʊ/	cow, loud
11	/ia/	/ɪə, εə/	chair, ear

12	/ua/	/ʊə/	schwa

Table 2b: Phonemic chart of NEY vowels

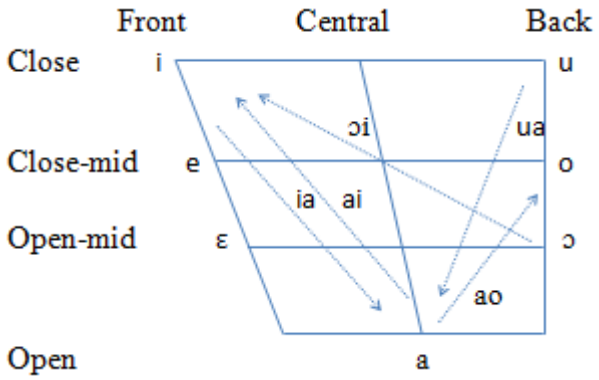


Table 3a: Consonants of NEY, adapted from Jowitt (1991)

S/N	NEY Sound	Corresponding RP form	Example words
1	/p/	/p/	pipe
2	/b/	/b/	blade
3	/t/	/t, θ /	tip, thin
4	/d/	/d, ð /	dip, this
5	/k/	/k/	keep
6	/g/	/g/	give
7	/ʃ/	/ʃ, ʒ, tʃ/	shoe, issue, child
8	/dʒ/	/dʒ/	judge
9	/f/	/f, v/	fan, van
10	/s/	/s, z/	sink, zinc
11	/m/	/m/	man
12	/n/	/n/	man
13	/l/	/l/	lie
14	/r/	/r/	road
15	/j/	/j/	yam
16	/w/	/w/	win

Table 3b: Phonemic chart of NEY consonants

	Labial		Alveolar		Palatal		Velar	
Nasal stops		m		n				
Oral stops	p	b		d		dʒ	k	g
				r				
Fricatives	f		s		ʃ			
Approximants				l		j		w

The point has already been made that NEY is heavily influenced by Yoruba. It then follows that since consonant clusters are prohibited in Yoruba (Akinlabi 2004:460; Taiwo and Adeniyi 2011:114; Owolabi 2011: 139), they are also dispreferred in NEY (Jowitt 1991: 81-82). This however does not accurately reflect the reality since a lot of consonant clusters are generally attested in the English of Yoruba speakers. As a matter of fact, it has been noted that the presence of consonant clusters in NEY has influenced lexical borrowings from English to Yoruba in such a way that many borrowed words are now freely used with their consonant clusters un-nativised (Adeniyi 2015b). A corollary of this is that NEY contains complex syllables with consonant clusters within both the onsets and codas of single syllables. But these complex syllables are still not as basic or as frequent as the CV type. Even in English, it is the universal CV syllable type that appears to be the most basic, and any syllable containing more segments is regarded as "more complex" (McMahon 2002: 106).

1.3 Sound Inventory of Child Iyinoluwa (IY) (2;3-2;5)

The speech of Iyinoluwa, the most longitudinally followed subject in this research, was studied between ages two years, three months (2;3) and two years, five months (2;5), and the inventories of his consonant and vowel sounds are presented in Table (4a-b) (Adeniyi 2015a:12-13)[1].

[1] Adeniyi (2015a) outlines only Iyin's consonant sounds; the vowels have been determined based on the data published in the work. Since this is the only available work on his speech at this stage, the available data is assumed to be representative of his speech at the time.

Table 4a: IY's Vowel sounds

	Front	Central	Back
Close	i/ĩ		u/ũ
Close-mid	e		o
Open-mid	ɛ		ɔ/ɔ̃
Open		a/ã	

Table 4b: IY's consonant sounds

	Labial		Alveolar		Palatal		Glottal
Nasal stop		m					
Oral stops	p	b	t^s	d^z	tʃ	dʒ	?
Fricatives	f						
Approximants						j	

Notice first that whereas IY used exactly the same set of oral vowels as adult Yoruba speakers at this stage, he used only four nasal vowels compared to five of adult speakers. This leaves [ɛ̃] of adult phonology. Also, his consonant inventory contained only ten sounds, in contrast to 18 used by adult speakers. Of his ten consonants, three [t^s, d^z, ?] did not exist in adult phonology; while [?] is a voiceless glottal stop used in place of velar stops /k, g/; [t^s] and [d^z] are affricated alveolar stops used in place of /t, d, s, ʃ/ (Adeniyi 2015a:12-13). This resulted in a lot of disparity between his phonology and that of adults and it captures why his speech was said to be childish.

2. Research Method

2.1. The Subjects

The subjects of this research comprised four children; Iyinoluwa (IY), Araoluwa (AR), Joshua (JS), and Tumininu (TU)[2]. At the time of data collection, all the four children resided in Ile-Ife, south-western Nigeria. The four children were bilingual in Yoruba and English. While TU and JS were three years, eight months (3;8)

[2] We thank the parents of the four children, who granted express approval for their children's participation in this research, were present throughout the elicitation periods, and assisted in encouraging the children to respond to questions.

and two years, four months (2;4) old respectively at the time of data collection, IY and AR were followed longitudinally. For IY, data were collected at ages two years, three months to two years five months (2;3-2;5), two years, ten months to three years (2;10-3;00), and three years, four months (3;4), whereas AR's data were collected in two phases; first for one week when he was aged two years, one month (2;1), and then for another week when he was two years, five months (2;5) (Table 5)[3]. Specifically, IY and AR were acquiring Yoruba primarily, with English being secondary. This is evident in the fact that, at home, Yoruba was the language of communication; interaction between the two children and their parents were done more frequently in Yoruba than English. Also, when IY and AR spoke English they often inserted Yoruba words, which indicated that they had acquired more of Yoruba lexicon than English at the time of data collection. The converse of this, whereby English may be inserted to make up for lexical deficiency in their Yoruba, was never observed. Speakers JS and TU, on the other hand, were acquiring English primarily and at the time of the data collection they spoke English more and habitually augmented their Yoruba with English lexical items. Also, the parents of speakers JS and TU emphasised that they were more comfortable with English than with Yoruba. For ease of referencing in the remainder of this article, the names and ages of the children are abbreviated as in Table (5).

Table 5: Abbreviations for data presentation

s/n	Code	Name/Age
1	IY/1	Iyinoluwa/2;3-2;5
2	IY/2	Iyinoluwa/2;10-3;00
3	IY/3	Iyinoluwa/3;4
4	AR/1	Araoluwa/2;1
5	AR/2	Araoluwa/2;5
6	JS	Joshua/2;4
7	TU	Tumininu/3;8

2.2. Data Items

In this article, "consonant sequence" has two possible interpretations; (i) in Yoruba, it refers to homorganic nasals followed immediately by a voiceless obstruent in the onset position of the following syllable, and (ii) in NEY it refers to clusters of

[3]Note that the sound system of IY presented in section 1.3 is of an earlier study of the speaker that covered only Ages 2;3-2;5. The speaker is followed further for this research and two more stages (2;10-3;00 and 3;4) have been added.

voiceless obstruents plus sonorants within single syllables. Although consonant sequences can also involve voiced obstruents plus sonorants in English, these are excluded because they are outside the focus of our argument. The research focused on voiceless obstruent-plus-sonorant sequences. This is because when the consonants are coalesced to yield a voiced obstruent output, it can be inferred that the [- Sonorant] and [+Voice] features of the output are specifically from the input obstruent and sonorants respectively. By this is meant that while only the input obstruent is realized in the output, the voicing must have come from the sonorant. This is not possible where the input obstruent is itself voiced because it is straightforward to posit a sonorant deletion analysis, which leaves only the obstruent with all its features in the output. This is why sequences of voiced obstruents plus sonorants are excluded from the data. In the light of this, the data used for this research comprised 44 Yoruba words containing syllabic nasals immediately followed by onset consonants of following syllables and 55 English words containing various kinds of consonant clusters. Most of these were words that the children were already exposed to in everyday life. These are complemented by nine Yoruba phrases containing the homorganic aspectual-marking nasal being followed by the onset consonants of following words. These are included in the data because the homorganic nasals are co-articulated with the following consonants in the flow of speech, and this creates the sequence being investigated.

2.3. Method of Data Elicitation

The data items discussed in section 2.2 above were not pre-conceived ahead of the research. Rather, speakers IY and AR were observed over time and words that they used in everyday lives were compiled into a wordlist. This implies that data from speakers IY and AR were collected in free play situations during which each of them was observed and relevant data from their natural conversations were transcribed. The limitation of this elicitation method is that data collected in this manner were limited to household items, words relating to basic activities that the children were exposed to, as well as words they had heard their parents and other adults around them use frequently. Data collection sessions were also subject to a lot of interruptions and noise. But data collected in such situations were of the natural speech of the children in the sense that they were not aware of the study and did not have to try to be more precise than their natural speaking. After this, supplementary data were compiled in a wordlist. The administration of this supplementary list involved saying the items and having the children repeat the words and phrases after the researchers.

For speakers JS and TU, the primary wordlist compiled from free play situations of IY and AR was merged with the supplementary wordlist to form a single wordlist. Data were elicited from them at different sessions. During the elicitation sessions, the

researchers said the items in the wordlist one after the other and they were required to repeat after them. Their responses were transcribed phonetically in a notebook. Each session lasted at least two hours and was divided into phases ranging between 10 to 20 minutes. This was because every time the child's attention strayed, he/she was consequently afforded a break.

In instances of uncertainty in the qualities of sounds, the researchers usually pondered on these with attention on perceptual cues expected of different articulatory gestures and further repetitions were required before choices were made. This only means that items from an earlier phase of data collection, for instance, were re-elicited in later phases of the elicitation sessions in order to ensure accuracy. This was done with all the four children involved, and it was partly because recordings were not made due to unstable attention spans of children around the age range being studied[4]. Also, for all the children, the language of interaction depended on the language for which data were collected; for Yoruba data, questions were asked in Yoruba, and for English data, questions were asked in English.

2.4. Method of Analysis

Data analyses were divided into parts, according to languages. Furthermore, grammatical classes were considered in serialising analyses; specifically in Yoruba, consonant-sequences within lexical items were analysed separately from those within phrases. Also, in analysing the data, phonological phenomena not under study were ignored so far as they have no bearing on the result. Such phenomena include fricative stopping, assimilation, tone stability, the simplification of doubly-articulated sounds, and the palatalisation of nasal consonants.

3. Data Presentation and Discussion

3.1 Homorganic Nasals in Yoruba

When a nasal stop is immediately followed by an oral consonant in Yoruba, the place of articulation of the nasal must be adjusted to harmonise with that of the following consonant (Owolabi 2011:61). This is consistent with the conceptualisation of homorganic nasals in the literature (Napoli 1996:8, Matthews 2007:178). It has been reported that, when confronted with such nasal-oral consonant sequences, however, children often simplify them by omitting one of the sounds. This appears to be the strategy employed by speaker JS in examples (1a-i) where he simply deletes the nasal,

[4] Braine (1976: 494) observes quite explicitly that "two-year-olds are subject to well-known vagaries of attention and a certain waywardness in their motivations"

which is the more sonorous in each sequence. He does this to avoid consonant sequences altogether and a consequence of this is that the harmonisation of place of articulation then becomes unnecessary.

(1) Deletion strategy by JS

S/N	JS	Adult target	Gloss
a	**àfàɲɪ́**	**àm̀ɲfàní**	benefit
b	**fáfó**	**dáḿɲfó**	bus
c	**káké**	**k͡páŋ̟ḿkpɛ́**	trap
d	**pɛ́pɛ́**	**sɛ́ŋ̟ḿkpɛ́**	calm down
e	**sósó**	**ʃóńʃó**	pointed edge
f	**osoro**	**òǹsɔ̀rɔ̀**	public speaker
g	**kàkà**	**kàŋ̀kà**	magnificent
h	**fɛ̀fɛ̀**	**fɛ̀mɲfɛ̀**	wide
i	**pàtí**	**k͡pàǹtí**	dirt

More data, especially from IY and AR who were acquiring Yoruba primarily, however, show that omitting one of the adjacent consonants may not be the primary strategy (2a-k). There is ample evidence that these children coalesce the consonants in each cluster, but this is only apparent when the post-nasal oral consonant is voiceless. This is because, as shown in examples (2a-k), both the nasal and the voiceless obstruent are not seen in the output; the sound that takes their place is rather the voiced counterpart of the obstruent. This suggests that the output sound combines the voicing of the nasal plus the minus sonorant feature of the obstruent. This may appear a little obscured by the place of articulation discrepancies in (2a-e,k). Even then, it will be noticed that labial-velars become bilabials in (2a, d-e) and labiodentals become bilabials in (2b-c, k). This is not arbitrary since the feature Labial is constant between the input and output in each case and this only points to the logicality of the handling of complex consonants by the children. This apart, the picture of coalescence in these data set is clear.

(2) Coalescence strategy

S/N	IY/1	IY/2	IY/3	AR/1	AR/2	JS	TU	Adult target	Gloss
a	bébé	bébé		bébé		bébé	bébé	k͡pénm̀k͡pé	short (e.g. of knickers)
b	àbàní	àbàní		àbàɲí			ãfãɲí	àm̀fàní	benefit
c	dᶻábó	dᶻábó	dᶻábó	dᶻábó	dʒábó		dã́fú	dám̀fó	bus
d	bábɛ́	bábɛ́	bábɛ́	bábɛ́			pám̀pɛ́	k͡pánm̀kpɛ́	trap
e				bɛ́bɛ́				sénm̀kpɛ́	calm down (slangish)
f	dᶻódᶻó	dᶻódᶻó		dᶻódᶻó			ʃóńʃó	ʃóńʃó	pointed edge
g		dᶻàdᶻò		dᶻàdᶻò			dʒàǹtò	dʒàǹtò	straight away
h		pàdᶻí		bàdᶻí			pàǹtí	kpàǹtí	dirt
i	òdᶻɔ̀jɔ̀	òdᶻɔ̀jɔ̀	òdᶻɔ̀jɔ̀	òdᶻɔ̀jɔ̀			ɔ̀ǹsɔ̀rɔ̀	ɔ̀ǹsɔ̀rɔ̀	public speaker
j				òdᶻɛ̀		òdɛ̀	ũtɛ̀	oǹtɛ̀	stamp
k		ɔ̀m̀bà		ɔ̀bà		ɔ̀bà	ɔ̀ǹfà	ɔ̀m̀fà	drawer

In some instances where both the homorganic nasal and the post-nasal consonant are voiced, it may appear that the children simply delete one of the clustering consonants (3a-e). But when we consider data that contain a homorganic nasal plus a following voiceless obstruent, as seen in (2a-k) it becomes apparent that although the nasal is dispensed with, its voicing shifts to and surfaces on the surviving obstruent such that the underlyingly voiceless obstruents in each of these utterances appear voiced. For speakers IY/1, IY/2, IY/3, AR/1, and AR/2 where data reflect longitudinal observation and are more natural in the sense that data collections were without their knowledge, coalescence is the primary strategy in (2a-k). It is noteworthy that speaker JS who favoured deletion, as shown in (1a-i), also coalesced in (2a, j-k), while speaker TU who appeared to be the most advanced in consonant sequence/cluster mastery also employed the coalescence strategy in (2a).

(3) Sequences of voiced homorganic nasal plus voiced consonant

S/N	IY/2	AR/2	JS	TU	Adult target	Gloss
a	amábá			anã́bá	alánm̀g͡bá	lizard
b	èmúbà				èrónm̀gbà	thought
c	bádᶻa				k͡pánda	inferior material
d	àjá	àɲã́	àɲã́		àǹlá	personal name
e	paja	paɲa		paɲa	k͡panla	stock fish

3.2 Homorganic nasals in Yoruba phrases

The homorganic nasals in (4a-h) below are different phonetic realisations of the aspectual marker of continuity (ASP-CONT) in Yoruba. This aspectual marker is an independent grammatical unit in Yoruba, separated from both preceding and following words by word boundaries. For instance, the phrase ***ɔmɔ ń lɔ*** "the child is going" is more accurately represented as ***/# ɔmɔ # ń #lɔ # /*** in which case the aspectual marker */n/* is not in the same word with the consonant */l/* following it, hence can ordinarily not be said to be in a cluster with it. Word boundaries however do not interact in any way with the consonant sequence reduction attested in the speech of the children studied in this research. By this is meant that whether the consonants are adjacent within a single lexical item (as in examples 1-3 above) or across word boundaries (as in examples 4a-h below) is immaterial; the coalescence is executed alike since in both cases, the consonants in a sequence are going to be co-articulated in the same way.

In essence therefore, the word boundaries existing in adult language simply do not exist in children phonology at these stages. It is clear that speakers IY/2, AR/1, AR/2, and JS were consistent in coalescing the homorganic nasal with following voiceless obstruents in such a way that the voiceless consonants are then phonetically realised as voiced. The few exemptions here are (4e, g-h) where JS rather deleted the nasal. Notice also that in addition to coalescence, the tone on the final vowels becomes a phonetic falling contour in the output (IY/2 (4a, d-f), AR/1(4a, d, f), JS (4d, f)). Contour tones in Yoruba are results of tone spreading whereby after a low tone, a high tone is realised as a low-high (rising) contour and a low tone following a high tone is realised as a high-low (falling) contour (Bamgbose 1990:41). In (4a, d-f) the homorganic nasals bear high tone, while the tones following in each case is low, which creates the structural condition for the formation of a falling contour tone attested in IY/2 (4a, d-f), AR/1(4a, d, f), JS (4d, f). It is then apparent that while the homorganic nasal is dispensed with and its voicing remains on the following oral consonant, its tone also survives as evident in the falling contour tones.

(4) Homorganic nasals in Yoruba phrases

S/N	IY/2	AR/1	AR/2	JS	TU	Adult target	Gloss
a	obɔ̂/mobɔ̂	ǒbɔ̂		mo: bɔ̀	mompɔ̀	moŋ̟ḿ k͡pɔ̀ 1sg ASP-CONT vomit	I am vomiting
b	mobí		jòbĩ	mo: bí		moŋ̟ḿ k͡pĩ́ 1sg ASP-CONT share	I am sharing
c	óbaʔuʔú		óbaʔuʔú	óbaʔuʔú	óḿpa kukú	ó ŋ̟ḿ k͡pa kukú 3sg ASP-CONT kill fowl	he/she/it is killing fowl
d	óbɔ̂	óbɔ̂		óbɔ̂	ó mbɔ̀	ó ń bɔ̀ 3sg ASP-CONT come	he/she/it is coming
e	odᶻâ		módᶻà	ota	moń́tˢà	mo ń tà 1sg ASP-CONT sell	I am selling
f	adᶻô	ádᶻô	a ńdᶻò	ádᶻô	á ńtò	a ń tò 1pl ASP-CONT queue	we are queuing
g	ódᶻɔji	ódᶻoɲĩ	óʔɔnĩ	ókɔji	ó ńjkɔrĩ	ó ńj kɔorĩ 3sg ASP-CONT sing song	he/she/it is singing
h	ódᶻá	ódᶻá	ódᶻá	ósá	ó ńsá	ó ń sá 3sg ASP-CONT run	he/she/it is running

Whether heterosyllabic sequence or not, it has been proven that obstruents are more prone to voicing in a post-nasal environment than in any other (Hayes 1995:2, Hyman 2001:154). This means that nasals readily spread their voicing feature to following voiceless obstruents. It then follows that when the nasal is lost and the voiceless obstruent surfaces as voiced, we have a sound combining features of the two different input sounds.

It should be pointed out that specifically at age 2;11, IY/2 started to master the clusters of homorganic nasals plus oral consonants, beginning with bilabials. In the sequence of labiodental sounds he retains only the place feature 'Labial' after which he is able to produce the cluster (5a). In (5b-c) involving bilabial nasal plus bilabial stop, he alternates between the coalescence of the sounds and the outright production of both members of the sequences. But in (5d-e) containing clusters of labial-velar nasals plus voiced labial-velar plosives, he dispenses with the velar and sticks with the labial component of the consonants, which enables him to produce the clusters. Also, when speaker TU is considered, it will be observed that she consistently used clusters; except that labiodental nasal becomes alveolar (5a) and labial-velar nasal becomes bilabial

(5d-e). These would seem to indicate the possible age around which significant mastery of consonant clusters emerge in the acquisition of Yoruba.

(5) Progress in cluster mastery in Yoruba

S/N	IY/2	AR/1	AR/2	JS	TU	Adult target	Gloss
a	òm̀bà	òbà		òbà	òǹfà	òm̩̀fà	drawer
b	bèbè/dᶻèm̀bè		dʒèm̀bè	kèkè	kèm̀bè	kèm̀bè	big trousers
c	bèbɛ́/bèm̀bɛ́	bèbɛ́	bèm̀bɛ́	bèm̀bɛ́	bèm̀bè	bèm̀bɛ́	a kind of drum
d	baba/bamba	babã	bamba		bamba	g͡baŋ̟m͡gba	openly
e	bãmbà	bàbà	bàm̀bà	bãbã	bàm̀bà	g͡bàŋ̟m̀g͡bà	big

Another significant indication from examples (5b-e) is the fact that both members of the consonant sequences are voiced. This suggests that voicing similarity between adjacent consonants supports mastery whereas voicing differences between them is consistently associated with the motivation to simplify as seen in examples (1-4).

3.3 Consonant Clusters in NEY

NEY offers a wider range of data on consonant clusters beyond those of homorganic nasals. It has been reported that at age 2;3-2;5, Speaker IY/1 consistently deleted segments when confronted with consonant clusters in a bid to conform all NEY words to the CV syllable structure (Adeniyi 2015a:11). A closer look at the data presented in Adeniyi (2015a:12) however suggests that in many instances, the child did not just delete sounds; he had already begun to retain features from deleted segments. For instance, the words “pray” (/ˈpreː/ in NEY) and “jumping” (/ˈdʒɔmpin/ in NEY) were rendered as [be] and [dʒɔbi] respectively; this shows that although he deleted /r/ and /m/, the voicing feature of these sounds were retained in the surviving consonants. His handling of clusters in NEY appears to have advanced with the expansion of his vocabulary in the sense that he no longer just got rid of one of the clustering consonants as is most often and naturally expected of children acquiring English. The principle that children delete one of the clustering consonants is contained in Radford, Atkinson, Britain, Clahsen, and Spencer (2009:98) and Rose and Inkelas (2011) to mention a few. On the contrary, IY handled this by fusing the consonants concerned. By this is meant that some features of the deleted consonant still show up in the surviving one such that the surviving consonant in place of a consonant cluster is really neither of the input consonants. In examples (6a-b) and (6c), the clustering consonants are [fl] and [fr]

respectively; observe that in all of these instances, the resultant consonant in IY/2's speech is [b] which apparently includes the labial feature of [f] and the voicing of [l] and [r] respectively. Also, [pl] and [pr] clusters tend to consistently yield [b] (see also 6d-h). This retention of the labial feature is due to the fact that bilabial sounds were among the few sounds he was able to produce well at this stage. Speaker AR/2 on his part shows consistency in coalescing adjacent consonants. Not only that, he also shows retention of the bilabial feature similar to speaker IY/2's (AR/2:6a-e,g). This coalescence approach falls within what Rose and Inkelas (2011) regard as exotic.

(6) Consonant clusters involving labial sounds in IY/2 and AR/2

S/N	IY/2	AR/2	Adult target (NEY)	Gloss
a	bɔː	bɔː	flɔː	floor
b	bai	bai	flaɪ	fly
c	bai	bai	fraɪ	fry
d	beː	beː	pleː	play
e	bet^{s}	bet^{s}	plet	plate
f	beː		preː	pray
g	bet^{s}	bet^{s}	preːs	prais e
h	bet^{s}		ples	place

Speaker JS presents a different picture (JS:7a-g), one consistent with the literature on this subject in the sense that he simply deletes the more sonorous member of each cluster. Speaker TU shows the most advanced mastery among the four children (TU:7a-b, d, g). In TU (7f) where she did not have the cluster, coalescence is again attested.

(7) Consonant clusters involving labial sounds in TU and JS

S/N	JS	TU	Adult target (NEY)	Gloss
a	fuɔ	flɔː	flɔː	floor
b	fai	flaɪ	flaɪ	fly
c	fai		fraɪ	fry
d	pe	pleː	pleː	play
e	pe		preː	pray
f	pes	bes	preːs	prais e

g	pes	ples	ples	place

In clusters involving sounds that the children have not mastered, speakers IY and AR follow the substitution principle indicated for IY/1 in section 1.3 whereby /t, s, ʃ/ are phonetically realised as affricated [tˢ] and /d, dʒ/ are realised as affricated [dᶻ]. Apart from these, both speakers execute the coalescence just as seen in data sets (2, 4, and 6). Notice that for IY/2, IY/3, AR/1 and AR/2 /sl/ is realised as [dᶻ] in (8b), IY/2 and AR/2 realised /str/ as [dᶻ] in (8c), and /ns/ as [dᶻ] in (8d). In all of these, the voicing in the output is always contributed by the deleted sonorants. Data IY/2 and AR/2 (8e-f) add a deeper view of the coalescence analysis, because rather than delete and leave voicing as its only trace, the sonorant /l/ also contributes its place of articulation to the output. This is because both speakers were yet to master articulation at the velar place and their usual substitution with /?/ was thus overridden by the availability of the alveolar place of the deleted sonorant. In the end, /k/ in these two words contribute only [-Son], and the deleted sonorant contributes everything else to the resultant sound. The fact that the deleted sonorant contributes not only its voicing, but also its place of articulation, lends substantial support to the view that what is happening in these cases can best be viewed as coalescence.

(8) Consonant clusters involving non-labial sounds in IY and AR

S/N	IY/2	IY/3	AR/1	AR/2	Adult target (NEY)	Gloss
a		badᶻin	badᶻim	badᶻin	vaslin	Vaseline
b	dᶻip	dᶻip	dᶻip	dᶻip	sliːp	sleep
c	dᶻɔdᶻ			dᶻɔndᶻ	strɔng	strong
d	idᶻaitˢ			idᶻandᶻ	insaɪd	inside
e	dᶻɔb			dᶻɔb	klɔːb	club
f	dᶻap			dᶻap	klaːp	clap
g	dᶻajĩ			dᶻaĩ	kraĩ	crying

As for the other speakers, JS still deletes the more sonorous member of the clusters, while TU shows that at age 3;8, she has learnt to produce consonant clusters in NEY (9a-g). One factor contributing to this mastery of speaker TU's is apparently her acquisition of English primarily. In this case she was more frequently exposed to the clusters of English than the other speakers.

(9) Consonant clusters involving non-labial sounds in JS and TU

S/N	JS	TU	Adult target (NEY)	Gloss
a		bastin	vaslin	Vaseline
b	tˢip	slip	sliːp	sleep
c	tɔt	srɔng	strɔng	strong
d	itˢais	insaɪd	insaɪd	inside
e	kɔf	klɔp	klɔːb	club
f	kap	klap	klaːp	clap
g	kaĩ	krajĩ	kraĩ	crying

4. Summary

How four children acquiring Yoruba and English handled the complexities of consonant sequences and consonant clusters during language acquisition has been discussed in this article. Data showed that two of the children, IY and AR, acquiring Yoruba primarily and English secondarily prefer to coalesce the sequence of homorganic nasal plus following consonants whether across syllable boundaries (within the same lexical items) (2) or across syntactic boundaries (in phrases) (4) in Yoruba. This is because in both instances they still have to co-articulate the adjacent consonants. In instances where they coalesce syllabic nasals plus a following voiceless obstruent in Yoruba, data showed that the output sound is always an obstruent combining the voicing feature of the nasal with [-Son] and [-Nasal] features of the input obstruent (2a-k,4a-h). These two children also employ the coalescence strategy in their acquisition of consonant clusters in English (6a-h, 8a-g). In the consonant clusters of English, the coalescence is such that the voicing quality of the more sonorant member of the cluster is retained along with the [-Son] feature of the obstruent. It has also been argued that this is due to the transference from their Yoruba to English since Yoruba was the more advanced language for them. Consonant coalescence is schematised in Figures (1a-b) below. In Figure (1a) the relevant features are [+Son], [+Nasal], and [+Voice] for the nasal consonant, and [-Son], [-Nasal], and [-Voice] for the voiceless obstruent. Whether the obstruent is a Stop or Non-stop is irrelevant since fricatives are converted to affricated stops by the two children involved. Notice then that it is essentially [-Son] and [+Voice] that characterise the output (since there cannot be [-Son, + Nasal] combination), and these were contributed one apiece by the two input consonants. The main manner in which Figure (1b) differs from Figure (1a) is in the

sonorant being broader since it is not limited to only Nasals as in Figure (1a). Thus, the output of Figure (1b) is essentially the same as in Figure (1a), with each input sound contributing a feature apiece.

Figure (1a) Consonant coalescence in Yoruba NEY

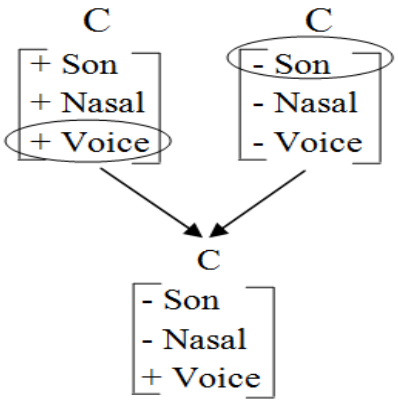
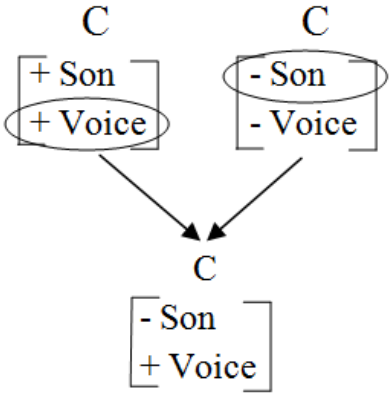


Figure (1b) Consonant coalescence in



Speaker TU, on the other hand, was acquiring English primarily and Yoruba as the secondary language. She had mastered most of the consonant clusters of English and consonant sequences of Yoruba; it was only on a few occasions that she coalesced. At age 3;8, she was also the oldest of the four children. This then points to the role of age in her non-reduction of clusters: she had learnt them. Acquiring English primarily also has a significant implication when comparing with children acquiring Yoruba primarily. English has more consonant clusters than Yoruba, and a child acquiring it will certainly be exposed to more of them than one acquiring Yoruba primarily. Since the frequency of a child's exposure to a particular pattern enhances his or her mastery, it can be inferred that speaker TU's primary language contributed largely to her better mastery of clusters in English and this then carried over to her better handling of consonant sequences in Yoruba. On the other hand, speakers IY and AR's exposure to Yoruba more than English implied less frequent exposure to consonant clusters. Since the nasal-oral consonant sequence is even limited in Yoruba, it means the frequency of their exposure to these complex segments was even lower compared to speaker TU's.

It is worth noting that it is predominantly where the speaker is acquiring Yoruba primarily that consonant coalescence was the primary strategy for consonant sequence reduction. This means that coalescence is essentially a strategy employed by children acquiring Yoruba and it only interferes with their English. But with children acquiring English, simple deletion of the more sonorous member of a cluster is the preferred strategy at earlier stages of acquisition, as revealed by speaker JS's data.

Up to this point, data has essentially been on sequences of a voiced sonorant plus voiceless obstruents. This is the only possible combination in Yoruba since the homorganic nasals involved are inherently voiced. But in English where voiceless-voiceless sequences are also possible, it becomes necessary to make reference to how children IY and AR would handle these. Examples (10a-e) show that in these sequences, both children produce voiceless outputs.

(10) voiceless-voiceless sequences in IY and AR's NEY

S/N	IY/2	AR/1	Adult target (NEY)	Gloss
a	**at^{s}ait^{s}**		**aotsaid**	outside
b	**bit^{s}it^{s}**		**biskit**	biscuit
c	**t^{s}u**	**t^{s}u**	**stul**	stool
d		**pet^{s}**	**spes**	space
e		**pet^{s}**	**pest**	paste

This is evidence that the voicing in the coalescence data is not from the adjacent vowel, but has to be from the deleted sonorant consonant. If the voicing were results of assimilatory spreading from the adjacent vowels, then we would have expected the resolved sequences in (10a-e) to come out as voiced. The fact that they do not lends more support to the argument that what children IY and AR do at these stages of their phonological acquisition is coalescence.

5. Conclusion

A phonological process termed "consonant coalescence" has been articulated in this article. The description of coalescence for consonants in child phonology, as has been done in this article, cannot be regarded as an anomaly since advancing scholarship in child phonology, especially in non-western languages has been predicted to uncover even yet unattested phenomena (Rose and Inkelas 2011).

Further, our findings show that exposure owing to the primary language being acquired accounted for the different strategies employed by the children in dealing with the complexity of consonant sequences and consonant clusters.

That most of the existing research on child phonology has been on a small number of children and on western languages, especially English-speaking, is an established fact (Radford et al. 2009:96, Rose and Inkelas 2011). It is also important to note that the phenomena encountered in child phonology are almost as diverse as the number of children studied, stages at which they were, as well as the languages being

acquired (Buckley 2003). This makes this article a contribution to child language acquisition from a less studied African Language. Although a large portion of our data was drawn from English, it should be emphasised that the English spoken by the children studied is significantly influenced by Yoruba.

It must also be reiterated that the manner in which speakers IY and AR handled consonant sequences at the stages reported in this article was significantly different from what is more widely-known in child phonology literature. Most accounts in the literature simply report the deletion of the most sonorous of the clustering consonants (cf. Smith 1973, Goad and Rose 2001, Radford et al. 2009, to mention only a few). However, an adequate analysis of speakers IY and AR's data requires that one goes some steps further. This is because there is clear evidence that they did not just delete the sonorous member of the cluster; they retained features that they were comfortable with (such as [Labial] and [Voice]) even if they had to then delete the rest. A corollary of this retention of some features of deletion candidates is that their approach is not in total conformity with the sonority hierarchy in the sense that they do not just select the least sonorous member of a cluster in order to achieve maximal difference with following vowels as indicated in Radford et al. (2009:104). Thus, their stray erasure does not apply to whole segments.

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Appendices: Wordlists

(1) Homorganic Nasals in Yoruba Words

S/N	IY/1	IY/2	IY/3	AR/1	AR/2	JS	TU	Adult target	Gloss
i	bébé	bébé		bébé		bébé	péḿpé/ bébé	k͡péŋ̱ḿk͡pé	‘short’ (e.g. of knickers)
ii	dᶻódᶻó	dᶻódᶻó		dᶻódᶻó		sósó	ʃóńʃó	ʃóńʃó	‘pointed edge’
iii		àjá			àɲã́	àɲá		àǹlá	‘personal name’
iv		paja			paɲa	pala	paɲa	k͡panla	‘stock fish’
v		bádᶻa				pã́da	páńda	k͡páńda	‘inferior material’
vi		ba?ɛ́jɛ́				n?ɛ́jɛ́	paŋkɛ́rɛ́	k͡paŋkɛ́rɛ́	‘cane’
vii		dᶻà?à				kàkà	kàŋ̀kà	kàŋ̀kà	‘magnificent’
viii		?ã̀?ã̀		dᶻɔ̀dᶻɔ̀/?ɔ̀/ɔ̀		kɔ̀kɔ̀	kã́kã̀	kɔ̀ŋ̀kɔ̀	‘frog’
ix		ã̀?ô				kô	àŋ̀kû	àŋ̀kô	‘group clothing’
x		nà?ɔ̂		?à?ɔ̂		kàlákɔ̀		làŋ́kɔ̀	‘giant snail’
xi		amábă				alábá	anã́bá	aláŋ̱m̀g͡bá	‘lizard’
xii	àbàní	àbàní		àbàɲí		àfàɲí	ã̀fã̀ní	àm̀ɲfàní	‘benefit’
xiii		èmŭbà					erúḿbà	èróŋ̱ḿgbà	‘thought’
xiv		ɔ̄tˢɛ̀		òdᶻɛ̀		òdɛ̀	ũtɛ̀	oǹtɛ̀	‘stamp’

S/N	IY/1	IY/2	IY/3	AR/1	AR/2	JS	TU	Adult target	Gloss
xv	dᶻábó	dᶻábó	dᶻábó	dᶻábó		fáfó	dãfú	dáḿfó	bus
xvi	bábɛ́	bábɛ́	bábɛ́	bábɛ́		káké	páḿpɛ́	k͡páŋ͡mkpɛ́	trap
xvii			ɲaba	aba			lamba	laŋ͡mgba	youth
xviii			bɛ̀bɛ̀/bɛ̀mbɛ̀	bɛ̀bɛ̀		fɛ̀fɛ̀	fɛ̀ḿfɛ̀	fɛ̀m̀fɛ̀	wide
xix		dᶻàdᶻò		dᶻàdᶻò			dʒàntò	dʒàntò	straight away
xx		pàdᶻí		bàdᶻí		pàtí	pàntí	kpàntí	dirt
xxi						kútá	kúńtá	kúńtá	short
xxii	òdᶻðjð	òdᶻðjð	òdᶻðjð	òdᶻðjð		osoro	òǹsɔ̀rɔ̀	òǹsɔ̀rɔ̀	public speaker
xxiii			téńdé	dᶻédᶻé		tete	téńté	téńté	edge
xxiv				ò?à		ũkà	òŋ̀kà	òŋ̀kà	numeral
xxv			bíńtḩ	bídᶻí		bitˢim	bḩńtḩ	bḩńtḩ	very small
xxvi				bóbó		popo	póḿpó	kpóŋ͡mkpó	club
xxvii				bɛ́bɛ́		pɛ́pɛ́	sɛ́ḿpɛ́	sɛ́ŋ͡mkpɛ́	calm down
xxiii				dᶻédᶻéjé		kékélé	kɛ́ŋ̀kélé	kɛ́ŋ̀kélé	small
xxix				óbò		dafo	bóńfò	bóḿfò	short dress
xxx		òm̀bà		òbà		òbà	òǹfà	òm̀fà	‘drawer’
xxxi		bɛ̀bɛ̀/dᶻɛ̀m̀bɛ̀			dʒɛ̀m̀bɛ̀	kɛ̀kɛ̀	kɛ̀m̀bɛ̀	kɛ̀m̀bɛ̀	‘big trousers’
xxxii		bɛ̀bɛ́/bɛ̀m̀bɛ́		bɛ̀bɛ̌	bɛ̀m̀bɛ̀	bɛ̀m̀bɛ́	bɛ̀m̀bɛ̀	bɛ̀m̀bɛ́	‘a kind of drum’
xxxiii		baba/bamba		babã	bamba		bamba	g͡baŋ͡mg͡ba	‘openly’
xxxiv		bãmbà		bàbà	bàm̀bà	bãbã	bàm̀bà	g͡bàŋ̀m̀g͡bà	‘big’

(2) Homorganic Nasals in Yoruba Phrases

S/N	IY/2	IY/3	AR/1	AR/2	JS	TU	adult target	gloss
i	obɔ̂/mobɔ̂		ŏbɔ̂		mo: bɔ̀	mompɔ̀	mo͡ŋ́ k͡pɔ̀ 1sg ASP-CONT vomit	'I am vomiting'
ii	mobí			jòbĩ	mo: bí		mo͡ŋ́ k͡pĩ́ 1sg ASP-CONT share	'I am sharing'
iii	óba ʔuʔú			óbaʔuʔú	óbaʔuʔú	ómpa kukú	ó ŋ͡ḿ k͡pa kukú 3sg ASP-CONT kill fowl	'he/she/it is killing fowl'
iv		óbɔ̂; ó mbɔ̀	óbɔ̂		óbɔ̂	ó mbɔ̀	ó ń bɔ̀ 3sg ASP-CONT come	'he/she/it is coming'
v	odᶻâ			módᶻà	ota	mońtˢà	mo ń tà 1sg ASP-CONT sell	'I am selling'
vi	adᶻô		ádᶻô	ádᶻô	ádᶻô	á ńtò	a ń tò 1pl ASP-CONT queue	'we are queuing'
vii	ódᶻɔji		ódᶻɔŋĩ	óʔɔni	ókɔji	ó ŋ́kɔrĩ	ó ŋ́ kɔorĩ 3sg ASP-CONT sing song	'he/she/it is singing'
viii	ódᶻá		ódᶻá	ódᶻá	ósá	ó ńsá	ó ń sá 3sg ASP-CONT run	'he/she/it is running'
vix			ŏdᶻô			mońtò	mo ń tò 1sg ASP-CONT queue	'I'm queing'

(3) Consonant Clusters (in NEY)

S/N	IY/1	IY/2	IY/3	AR/1	AR/2	JS	TU	adult target (NEY)	gloss
i		bɔː			bɔː	fuɔ	flɔː	flɔː	floor
ii		bai			bai	fai	flai	flaɪ	fly
iii		bai			bai	fai		fraɪ	fry
iv		bai				fai	spaɪ	spaɪ	spy
v	be	bet^{s}		beː	bet^{s}	pe	pleː	pleː	play
vi	be	beː		beː		pe		preː	pray
vii		bet^{s}			bet^{s}	pes	bes	preːs	praise
viii		bet^{s}				pes	ples	ples	place
vix	pi	d^{z}ip	d^{z}ip	d^{z}ip	d^{z}ip	t^{s}ip	slip	sliːp	sleep
x		id^{z}aits			id^{z}and^{z}	it^{s}ais	insaɪd	insaɪd	inside
xi		d^{z}ɔd^{z}			d^{z}ɔnd^{z}	tɔt	srɔng	strɔng	strong
xii		d^{z}ajĩ			d^{z}aĩ	kaĩ	krajĩ	kraĩ	crying
xiii		d^{z}ɔb			d^{z}ɔb	kɔf	klɔp	klɔb	club
xiv		at^{s}ait^{s}				at^{s}at^{s}	aosaɪd	aotsaid	outside
xv	dʒoji	t^{s}oji				toji	stori	stori	story
xvi		d^{z}ap			d^{z}ap	kap	klap	klap	clap
xvii		t^{s}uː		t^{s}uː		t^{s}u	stuː	stuːl	stool
xviii		d^{z}ip				t^{s}ip	klep	klip	clip
xix		d^{z}ai				tai		traɪ	try
xx	pipa	bibat^{s}		bibait^{s}		tipas	slipas	slipas	slippers
xxi			bad^{z}in	bad^{z}im			bastĩn	faslin	vaseline
xxii	t^{s}it^{s}i	bit^{s}it^{s}						biskit	biscuit
xxiii		bet^{s}	bet^{s}	bet^{s}				plet	plate

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'BRA, SƐN, YƐNKƆ... THAT IS ALL I KNOW IN AKAN': HOW FEMALE MIGRANTS FROM RURAL NORTH SURVIVE WITH MINIMUM BILINGUALISM IN URBAN MARKETS IN GHANA

Gladys Nyarko Ansah, Jemima Asabea Anderson, Suleman Alhassan Anamzoya, Fidelia Ohemeng

Abstract

In this paper, we explore the language-migration nexus among female migrants, *Kayayei*, in three urban markets in Accra, Ghana. We assume in this paper that first time migrants from northern Ghana will face linguistic challenges in these markets because the linguistic situation in urban centres in Ghana is very diverse and complex. Typically, first time migrants from northern Ghana may hardly speak the major languages that are spoken in Accra: Ga, Akan, Ewe and English. Nevertheless, they have to learn to negotiate fees with the clients (whose luggage they carry) as well as tax officers who chase them all over the market to collect the daily income taxes from them. How do the migrants cope in such complex linguistic situation of the host community? What strategies do these migrants resort to in coping with the linguistic challenges they face in their new (host) communities? We investigate the linguistic challenges that migrants face in their new environment, and identify the coping strategies the migrants employ to meet these linguistics challenges. We first identify the dominant language(s) of the markets to see if it is/they are indeed different from the languages spoken by the migrants. We then examine the language (s) migrants select for business transactions in these markets. Finally, we attempt to evaluate the level of competence the migrants have in the selected language for business and explore why migrants choose to do business in the particular language (s) irrespective of their level of competence in the selected language. Our investigation revealed Akan as the dominant language of all three markets. It also revealed that very minimum linguistic exchange is required in the line of business of the *Kayayei*. This implies that very little linguistic knowledge in the market language may be sufficient to conduct business in their line of business. Incipient bilingualism, learning the appropriate

registers (key vocabulary) needed to transact business in the markets, emerged as the most employed coping strategy among the migrants.

Keywords: Language and Migration, female migration, incipient bilingualism, Ghana

1. Introduction

In this paper, we employ ethnographic methods to explore the linguistic habits of *Kayayei*, female migrants who carry loads around for a fee in urban markets in Ghana. 205 *Kayayei* were studied across three urban markets in Accra, the capital of Ghana. Our objectives in this paper are: (i) to investigate the linguistic challenges that these female migrants face in their host communities; (ii) to identify the coping strategies the migrants employ to meet such linguistic challenges. We first identify the dominant language(s) of the markets where these migrants work in order to ascertain whether or not the languages spoken by the migrants are different from the language(s) of these markets. Secondly, we explore the language(s) that the migrants use for business transactions in the markets. We also try to understand the reasons why migrants do business in the particular language(s) they have chosen. Finally, we attempt to evaluate the level of competence the migrants have in the selected language for business.

Migration may be loosely defined as the movements of people either as individuals or groups from one place to another for various reasons. Aspects of this phenomenon, for instance, how to conceptualise such human movements and how to proffer scientific reasons behind such movements have attracted a lot of academic attention. The consensus in the literature appears to be that migrants are a group of people who have moved from their place of origin/birth or place of residence to another destination (Yaro et al 2011:45). Nevertheless, there does not seem to be any consensus on how long the movement must last to qualify to be described as migration. While some researchers argue that migration may be established only when such human movements last for a period of at least six months, others think that one year should be the defining parameter of migration in order to distinguish it from other movements. For instance, human movement from A to B is not usually considered to be 'migration' unless there is at least some indication of a shift in residence from A to B for a minimum period of time (UNDP, 2009 as cited in Awumbila et al. 2012). What constitutes a move in residence, or, what is the required minimum period to be spent at a destination in order for a movement to be classified as migration is still a matter of debate.

Defining a 'migrant' is as problematic as defining migration is. Harvey and Brand (1974) have categorised migrants into four movement groups based on the time spent at the new destination. They classify people who have moved to a new place (found a new residence) for less than one year as *neophytes*. People who have move for

one to five (1-5) years are described as *transitional migrants*; people who have moved for six to nineteen 6-19) years are known as *long-term migrants*; and those who have moved for twenty (20) or more are referred to as *permanent* migrants. We adopt this classification in this study. Also, the term 'migrant' should be understood as covering all cases where the decision to migrate is taken freely by the individual concerned, or encouraged by parents/guardians and friends.

Migration remains a topical issue both internationally and the locally. Recent studies on migration in Ghana have shown that migration has gender-differentiated causes and consequences (Awumbila et al, 2011; Ardayfio-Schandorf and Kwafo-Akoto, 1990). They also reveal that female migration is of much greater volume and complexity than was previously believed. According to the UN (1995), female migration is increasing despite the constraints of women's dependent position within the family and society, as households are in need of income, and more employment opportunities are available to women. For instance, in some towns and cities in Latin America, the Caribbean, and parts of South East Asia, rural out-migration is female selective. Urban sex ratios usually show more women than men and levels of female household headship are higher in urban areas than in rural areas (UN 1995).

Whilst the last two decades have witnessed considerable attention on international migration, poverty alleviation and development, (IOM 2005; Adams and Page 2005), internal migration which is even more important in terms of the number of people involved and perhaps even the amount of remittances they send back home (Deshinkar, 2005), has recently been recognised as an important motivation for migrating out of poverty (IOM, 2005). Indeed, the literature suggests that migratory movements are primarily dominated by economic motives and expectations (Connell, J., Dasgupta, B., Laishley, R., & Lipton, M., 1976; Rhoda, 1983; Massey et al. 1993; Portes 1994; Awumbilla et al., 2012).

In other words, many migrants move out of their places of origin in search of work. In Ghana, the last twenty years have seen the southward movement of relatively young female population from the northern parts of Ghana into the cities, e.g. Accra, Kumasi, Takoradi for long term or short term to engage in various activities of economic value (Anamzoya, 2001). The UN Convention on the Rights of Migrants defines a migrant worker as a person who is to be engaged, is engaged or has been engaged in a remunerated activity in a state of which he or she is not a national. Even though *Kayayei* are typically Ghanaian nationals, they are ethnically and linguistically not nationals in the states (urban markets) where they are engaged in a remunerated activity (carrying load around for a fee in urban markets in Ghana). What role does language play in the economic activity in which these migrants are engaged in their host communities?

1.1. Language in a migrant's life in his or her new home

Sociolinguistic literature point to a very important relationship between language and migration. The literature is replete with reports on how migration trajectories tend to influence or shape the heritage languages of both migrant communities and the host communities. For instance, Backhaus (2007) links the Frenchification of Brussels to the influx of French-speaking populations in the city.

This important relationship that holds between language and migration reflects in the lives of migrants even in intra-national migration situations. In multi-lingual communities especially, where migrants move from rural communities to urban and peri-urban communities, there is always a need for the newly arrived migrants to learn the language of the urban community to which they migrate. The levels of proficiency or acquisition may vary depending on the motivations for learning the new language, the functions/domains in which the second language is used, the length of stay of the migrant in the new community, and the frequency of use of this language. In this paper, we discuss the incipient bilingualism as a major coping strategy among female migrants from Northern Ghana who work as *Kayayei* in three urban markets in Accra. The *Kayayei* are popularly known as *head porters* in the literature on Ghanaian migration (GHAFUP 2010, Alvin 2012, Osei-Boateng 2012, Marie Stopes International 2014, CSIS 2015).

The linguistic situation in urban centres in Ghana poses a significant challenge to many female migrants, especially when they first arrive. Many of these migrants who come to Accra, for instance, can hardly speak the major languages that are spoken in Accra: Ga, Akan, Ewe and English. Consequently, they resort to different strategies to cope with the linguistic challenges they face in their new (host) communities. Since many of these migrants migrate for economic reasons, they have to learn the languages spoken in the urban centres in order to get jobs or function effectively. For instance, they have to learn to negotiate fees with the clients whose luggage they hope to carry. They also have to learn to communicate with the tax officers who chase them all over the market to collect the daily income taxes from them. Since the linguistic composition of Accra is so complex and diverse, they have to select the language(s) to use in this new context. How do the migrants cope in such complex linguistic situation of the host community?

Specifically, this paper addresses the following questions:

1. What linguistic challenges do the migrants face in their new environment?
    a. What is/are the dominant language(s) of the selected markets?
    b. What are the linguistic backgrounds of the female migrants?
    c. Is/are dominant language(s) different from migrants' L1 or (an)other known language(s)
2. What coping strategies do the female migrants employ to meet these linguistic challenges?
    a. What is/are the migrants' preferred language(s) for business?
    b. Is/are the preferred language(s) different from their own L1?
    c. Is/are the preferred language(s) the dominant language(s) of the market?
    d. What is the motivation for selecting the preferred language for business?

Generally, this paper assumes that migration has long term linguistic consequences which have to be faithfully and carefully documented at every stage. For example, in this case, the female migrant porters may learn the dominant languages used in the host communities in the long term and shift from their mother-tongues to these languages or they may develop a form of bilingualism in which case they speak the dominant language of the host community when they go to work and thereby acquire a second language that they may use for functional purposes. Apart from this situation, even when they go back to their villages, especially for those of them who are seasonal migrants, they may still continue to use their newly acquired second languages to show that they have acquired a higher status because they have travelled to other parts of the country and are modernised or urbanised. In this situation, multilingualism may also develop in those communities where they migrate from. So, whichever angle we choose to look at it from, migration has very important consequences for individual bilingualism or societal bilingualism.

2. Bilingualism

There is a proliferation of definitions of the concept *bilingualism* in the literature (Mackey 1970:583). The phenomenon may generally be defined as the use of at least two languages by an individual. For example, the American Speech-Language-Hearing Association (ASHA, 2004) has defined it as a fluctuating system in children and adults whereby the use of and proficiency in two languages may change depending on the opportunities to use the languages and exposure to other users of the languages, a dynamic and fluid process across a number of domains, including experience, tasks, topics, and time. However, Li Wei (2000) points out that defining bilingualism is a rather difficult thing to do because bilingualism is a complex phenomenon with many

different dimensions (see also Skutnabb-Kangas 1981). In this section, we provide an overview of common definitions of bilingualism in the literature in order to describe our respondents who have migrated to work in city markets where the language(s) of business is/are different from their home languages.

On the one hand, theoretical linguists tend to base their definitions of bilingualism on the linguistic competence of the bilingual, i.e., how an individual masters two languages. To this end, Bloomfield (1933) defined bilingualism as 'the native-like control of two or more languages'. Competence-based definitions of bilingualism have received several criticisms, principal among which are: (1) that they do not adequately discriminate between language knowledge and language use; (2) that they do not clearly explain the basis for comparison, i.e. who constitutes the normative (native) group; and (3) that they do not specify the required level of competence (Skutnabb-Kangas 1981). Baker (1993) has also described Bloomfield's definition above as extreme and maximalist as well as ambiguous. Baker (1993) advocates the need to distinguish between language ability (degree) and use (function) in defining bilingualism. He argues that the four language skills that are typically used as indices of a person's linguistic competence (listening, speaking, reading and writing) all emphasise language ability but not function.

Another major criticism of the competence-based definitions of bilingualism concerns the criteria for selecting a particular language ability as the basis for establishing bilingualism. Whereas some people have a speaking ability only in a second language, others have reading/writing ability only and cannot engage in any natural context-based spoken discourse in a second language. Again, how should the level of language ability or competence necessary to establish bilingualism be measured? For instance, are passive/receptive bilinguals who can only, but fully, understand a second language without speaking, reading or writing it, more or less bilingual than people who have less highly developed levels of more than one of the language abilities in a second language but who are nonetheless very functional in terms of actual natural language use? For instance, during the data exercise for this study, we came across several migrants who showed understanding of Akan, the dominant language of the markets, but who could not engage in any meaningful talk-exchange with us in the language; they used intermediaries/mediators (their colleagues who had the abilities of understanding and speaking) to either answer our questions or ask their own.

Sedlak (1983) describes a situation in Kenya where a handful of people across many towns learn enough Hindi just so they can describe the plot of Hindi-language films that were shown to their friends (for a fee - free entry ticket to watch the movies). Are any of these groups of people more or less bilingual than the others? Ansah (2011) enumerates the difficulty involved in selecting any one of the language abilities over the others or all the language abilities as a criterion for establishing bilingualism.

Other studies have also shown that people who grow up in multilingual communities may acquire bare functional competence in many additional languages, and may not worry about the level of ability required to be considered competent in a language (Van Herk 2012; Sridhar 1996). Against this backdrop, the maximalist definitions of bilingualism, indeed, appear vague.

On the other hand, Diebold (1964) proposed the minimalist approach to defining bilingualism. His concept of 'incipient bilingualism' allows people with minimum knowledge in a second language to be classified as bilinguals. Based on Diebold's concept, Kroll and De Groot (1997:170) define bilingualism to include 'all individuals who actively use, or attempt to use, more than one language (even if they have not achieved fluency in the second language)'. This approach allows people who know nothing beyond forms of greeting and response in a second language, but who use or attempt to use the form/forms of the language they know, to be categorised as bilinguals. This definition qualifies the majority of our respondents as bilinguals. 98 out of 114 (86%) of the respondents (who answered this particular question) self-reported to be bilinguals even though not all of them could engage in lengthy interactions in their reported second languages. The character of bilingualism among the group we studied and the factors affecting bilingualism among them is further discussed in section 5 below.

Unlike the competence-based definitions of bilingualism, function-based definitions focus on what languages are used for or may be used for in society. For instance, while Weinreich (1968) defined bilingualism as the practice of alternately using two languages, Mackey (1970:554) opines that 'bilingualism is not a phenomenon of language; it is a characteristic of its use. It is not a feature of the code but of the message. It does not belong to the domain of langue but parole'. Mackey further suggests that the definition of bilingualism should be based on interconnections among the various language abilities where each language ability can be seen as a continuum in which speakers may have different competences for the respective languages at different levels and in different contexts. For example, our experiences from the field work we observed that even though some migrants appeared not to have a lot of competence to communicate fluently in Twi, the language of the markets, they showed a lot more competence in comprehension ability - they would explain the situation, e.g. their terms in negotiating price, to an intermediary in a way that suggested that they have understood our terms.

Function-based definitions seem to have become the basis for defining bilingualism among researchers who view bilingualism as a 'spectrum or continuum' which runs from relatively monolingual second language learners to highly proficient (near native) second language speakers or users (Dako 2001, Guerini 2006). According to Ansah (2011) this approach to defining bilingualism provides a better framework for

dealing with the complexities inherent in bilingualism as a phenomenon because it enables researchers to focus on a particular point within the continuum and to draw conclusions that are not over-generalised or oversimplified. From this perspective, we may describe a cline of bilingualism (from incipient bilinguals to highly fluent bilinguals) in the language of the market and the L1 of the female migrants we studied.

It has been established in both bilingualism and sociolinguistics literature that bilingualism is a by-product of language contact situations, which may arise from several factors including migration. In every language contact situation, some sociolinguistic groups appear more powerful, through political power, economic power or dominance in terms of sheer numbers. In this regard, immigrant communities tend to be less powerful in their new environment. Consequently, asymmetrical bilingualism is expected. In other words, we expect the less powerful linguistic group, e.g. immigrant community, to adopt the language of the powerful group in order to access education, government services or jobs (Van Herk 2012). Asymmetrical bilingualism may lead to language shift, especially in prolonged language contact situations (Bourhis and Giles 1977; Weinreich 1953). Nevertheless, under certain circumstances, minority language groups have maintained their language in the face of a more socio-politically, economically, or regionally dominant language. In other words, bilingualism can occur without language shift. We find this situation in this study where migrants from the Mole-Dagbane language group (who form the majority of our respondents) maintain their L1 in the face of urban multilingualism - they learn to use the language(s) of the market with clients but revert to their L1 with their friends and work colleagues.

According to Van Herk (2012), demography is one of the major factors that ensure language maintenance in the face of language dominance. For instance, Pendakur and Kralt (1991) have reported (based on census data) that living in a large linguistic enclave encourages the retention of immigrant languages. Again, Ogbu (1978) suggests that if large groups of immigrants believe or have hope that they will return to the country/town of origin, they maintain their home language. Again, migrants from the Mole-Dagbane language family appeared to form linguistic islands in their new communities and so do not shift from using their L1. The analysis of the data reveals the development of a form of bilingualism among many of the female migrants in the selected markets. Section 5 of the paper presents the analysis of the data, major findings and discussion of these findings. But before then, we present some background information about the study sites as well as an overview of our methods of data collection in the next two sections.

3. The Study Area

Agbogboloshie, Madina and Dome are suburbs of Accra, the capital of Ghana, and one of the most linguistically complex cities in the country. It is a cosmopolitan city, the most urbanised city in the country, with a very high level of ethnolinguistic diversity. Although official reliable estimates do not exist, a rough extraction from the 2010 Housing and Population Census suggests that almost all the languages that are spoken in Ghana are represented in Accra. Four languages, Akan, English, Ga, and Hausa stand out as the most important languages of present-day Accra. According to Dakubu (1997) although the ethnic language of Accra is Ga, there are strong indications that the city's largest ethnolinguistic group is Akan and there are more Akan speakers in Accra than Ga speakers.

These three communities were selected as our research sites because they are common destinations for many migrants from all parts of the country, especially, the northern parts of Ghana. The strongest points of attraction in these market communities for migrants in Accra are the big markets that are located there. Unlike the other big market centres such as Makola, Malata and Kaneshie Markets (also in Accra), migrant communities have sprung up around Agbogboloshie, Dome and Madina Markets and so there is no need for the migrants to commute to the markets. Given that the migrants have moved out of their places of origin in search of better economic conditions, it makes economic sense that migrants would choose the study sites as their destinations. At least they do not have to have a budget for commuting to work; they live and work in these markets.

These markets are well-known as the hub of both wholesale and retail of major staples such as yam, plantain, maize, beans, and assorted vegetables from within Ghana and other West African countries such as Burkina Faso, Niger and Togo. The Agbogboloshie market, also known as the Old Fadama market, is located in the central business district of Accra. The Agbogboloshie community is of recent origin. It has a population of about 40,000 persons (2010 Housing and Population Census). It is also a well-known dumping ground for electronic waste (e-waste) from both Ghana and other nations. It is also known as the largest onion market in Ghana. In the 1960s Agbogboloshie was a wetland known as Old Fadama or Ayalolo[1]. In the early 1980s, it was populated by internally displaced persons from the Kokomba-Nanumba war in the Northern region of Ghana (Dakubu 1997), though migrants from other parts of Ghana can be found there. The market and the community itself overlap, making the boundaries between the two a bit blurred.

[1] Ayalolo in Ga means 'we are still going'. This is perhaps due to the fact that the settlement was not supposed to be a permanent one, but a transient one.

The landscape of the Agbogboloshie community is characterized by wooden structures, thus, making the area prone to fire outbreaks, which is also partly due to the haphazard nature of electrical wiring. In addition, there are dormitories that have been constructed by Non-governmental and Christian organisations, as well as some individuals around the market which provide basic sleeping places for these migrants. Furthermore, the community is poorly demarcated; it has no running water and sanitation facilities. It is also known to be the hideout of drug peddlers, prostitutes and armed robbers. The area is heavily polluted with smoke coming from the burning of the e-waste. Perhaps, in recognition of the harsh living conditions of the area, the area has been nicknamed Sodom and Gomorrah. Many of the people who live at Agbogboloshie work around the market.

The Madina market, the second research site, is within the Madina community and is located on the North-eastern part of Accra, in the La Nkwantanang-Madina Municipal Assembly. The community was established by migrants on 14th June 1959 (Quarcoo et al 1967, Dakubu, 1997; Ntewusu 2005). The migrants, led by Alhaji Seidu Kardo were given the land by the Ga Mantse, the chief and land owner of the Ga people, the ethnolinguistic group who originate from Accra. The total initial population of this settlement was 849 persons (Dakubu, 1997: 7). Today, it is ranked the 12th most populous settlement in Ghana with a population of 137,162 persons (2010 Housing and Population Census). The market serves not only the Madina community but also outlying areas such as Legon, Adentan, Ashaley Botwe, East Legon, Abokobi etc. Unlike the Agbogboloshie community, the Madina community boasts of modern buildings.

The third research site, Dome market, is situated in the Ga East Municipal Assembly. With a population of 78,785, it is the 19th largest settlement in Ghana in terms of its population. Like Madina, the community boasts of modern facilities and is home to people from different ethnic groups. The Dome market serves other communities such as Kwabenya, Taifa, Ashongman, and the Ofankor area. There is a railway line that feeds the market with foodstuffs from other parts of the country. As such it is a destination for migrants from rural Ga as well as peri-urban towns outside Accra. The majority of the residents are traders and civil servants.

4. Data Collection Methods

The target population were *Kayayei* who work at the three markets. We identified specific spots at the markets where they congregate and interviewed those who were willing to take part in the study. In other cases, they were spotted when carrying goods to awaiting taxis, cars and *trotros* or to market stalls or when they were carrying the head pan, looking for customers. The main instruments used for gathering data were

interviews, questionnaires and observation. In all, 118 respondents provided information for the study. The *Kayayei* were interviewed on their demographic characteristics, reasons for migrating to Accra and the language used in their interactions with customers, family and friends, among other things. The questionnaires were both open-ended and closed-ended. The answers were written by the researchers due to the fact of the low levels of literacy among most of the respondents. The interviews lasted for between 30 minutes and one hour. The interviews were conducted mainly in Twi, a major dialect of Akan which emerged as the dominant language used in the three markets, and dialects of the Mole-Dagbane language family which emerged as the L1 or L2 of majority of our respondents. However, there were instances in situations where none of the researchers or research assistants spoke a respondent's language. In such instances, we had to rely on interpreters/translators (from other *Kayayei* or other workers in the markets) for the interview. Additional data were collected through the observation of the interactions between the *Kayayei* and their customers and also with their peers. The data obtained were analysed both qualitatively and quantitatively.

5. Findings and Discussion

The analysis presented here originated from a multisite project that examined linguistic challenges and coping strategies among female migrants in three urban markets in Ghana. Data were collected from three very busy and popular markets in Accra: Agbogboloshie, Madina and Dome markets.

5.1 Characteristics of the Respondents

The youngest respondent was 10 years old with the oldest being 57 years. However, the majority of the respondents, fifty-four (54%) were between the ages of 10 and 24 years. Twenty percent (20%) of the respondents had no idea of their ages. Surprisingly, only one (1) of the 118 respondents was between the ages of 44 and 69. All the 118 female migrants were *Kayayei,* mostly engaged in head porterage (carrying wares/goods around the markets for fees). Indeed, when we asked respondents to indicate their type of work, 96.5% indicated that they were *Kayayei*. The rest said they engaged in petty trading and dish washing mainly but also carried goods sometimes.

The age distribution of the respondents indicates that (47%) of the migrants are of school going age (10-19 years old). Under the Free, Compulsory Universal Basic Education (FCUBE) policy (which Ghana purports to implement), children within the

age bracket indicated above are expected to be in school. The FCUBE makes it mandatory for every child in Ghana to begin primary school at age six (6), have six years of primary education and three years of Junior High education (where (free) basic education ends). However, the fact that usually the child is expected to continue school (three years of secondary education and four years of University/post-secondary education/training) in order to be fully equipped and positioned to be gainfully employed, further raises the percentage of the migrants/respondents who are supposed to be in school/training to more than half of the respondents (55%). Figure 1 below shows the age distribution of respondents.

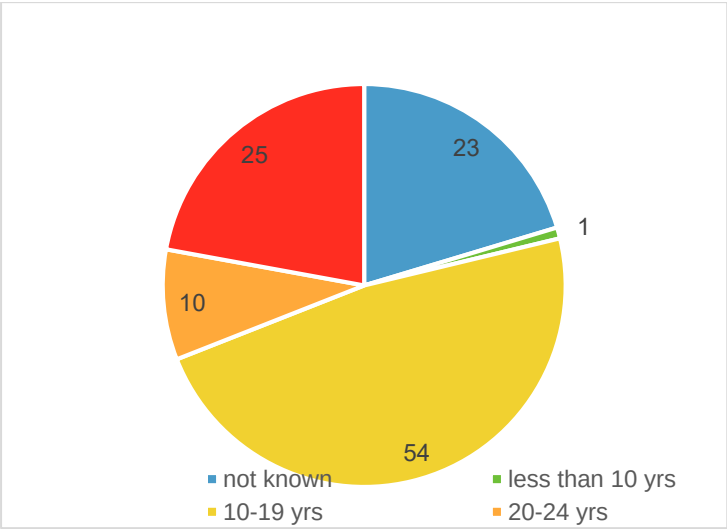

Figure 1: Age distribution of 118 respondents

The fact that majority of our respondents are deprived formal education reflects in the level of education (and literacy) among our respondents - only 57.9 of the predominantly youthful migrants have received formal education. Even then the majority have had only primary education; only a few have had a full course of the FCUBE. The remaining 42.1% have had no education at all. Figure 2 below shows the level of education of the *Kayayei* in these urban markets.

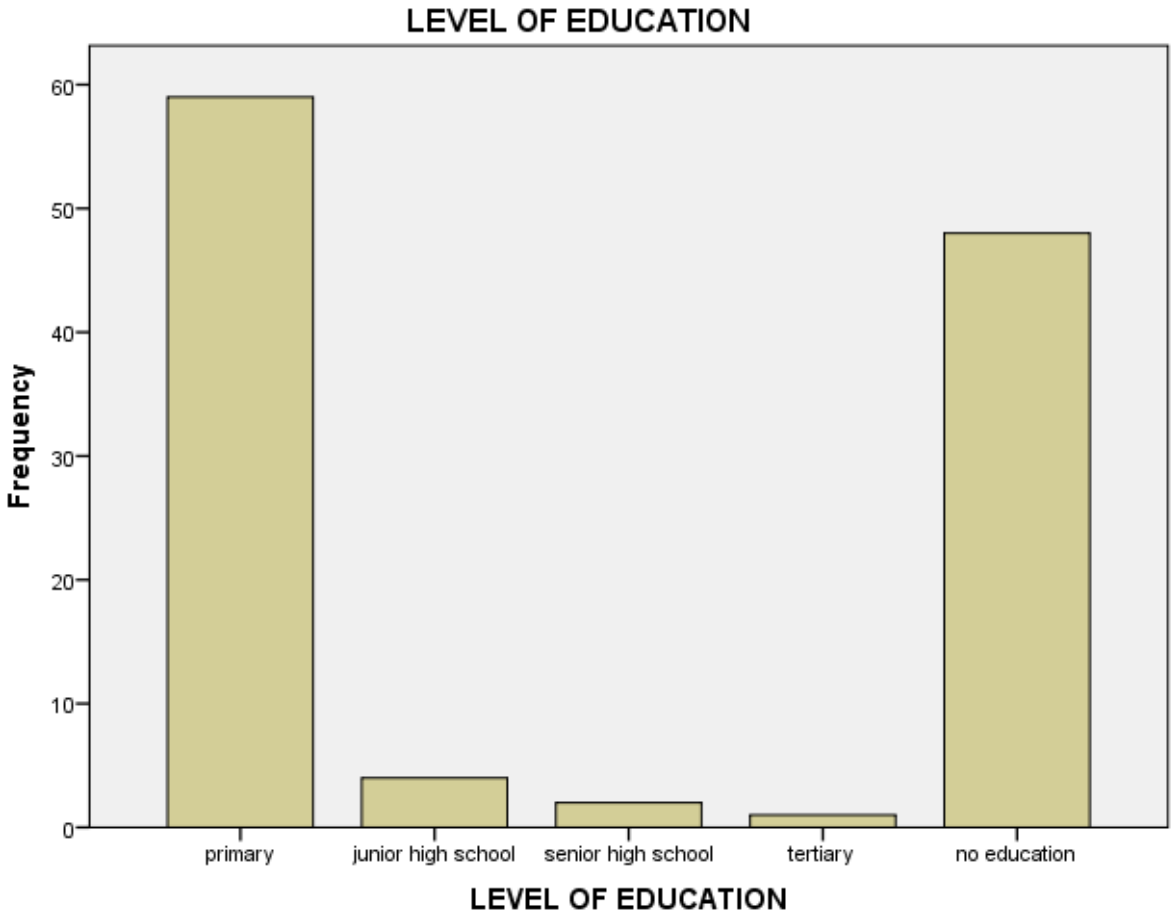

Figure 2: Level of education among respondents

In terms of where the migrants had moved to these markets, our respondents traced their places of origin to 6 geographical regions: Central Region (3), Greater Accra Region (1), Volta Region (4), Upper East Region (8), Upper West Region (30) and Northern Region (72). From these figures, it is obvious that an overwhelming majority of the female migrants in these markets (110, constituting 93.3%) originate from the northern part of the country. Figure 3 below shows the places of origin (in terms of geographical/administrative region) from where our respondents migrated to Accra.

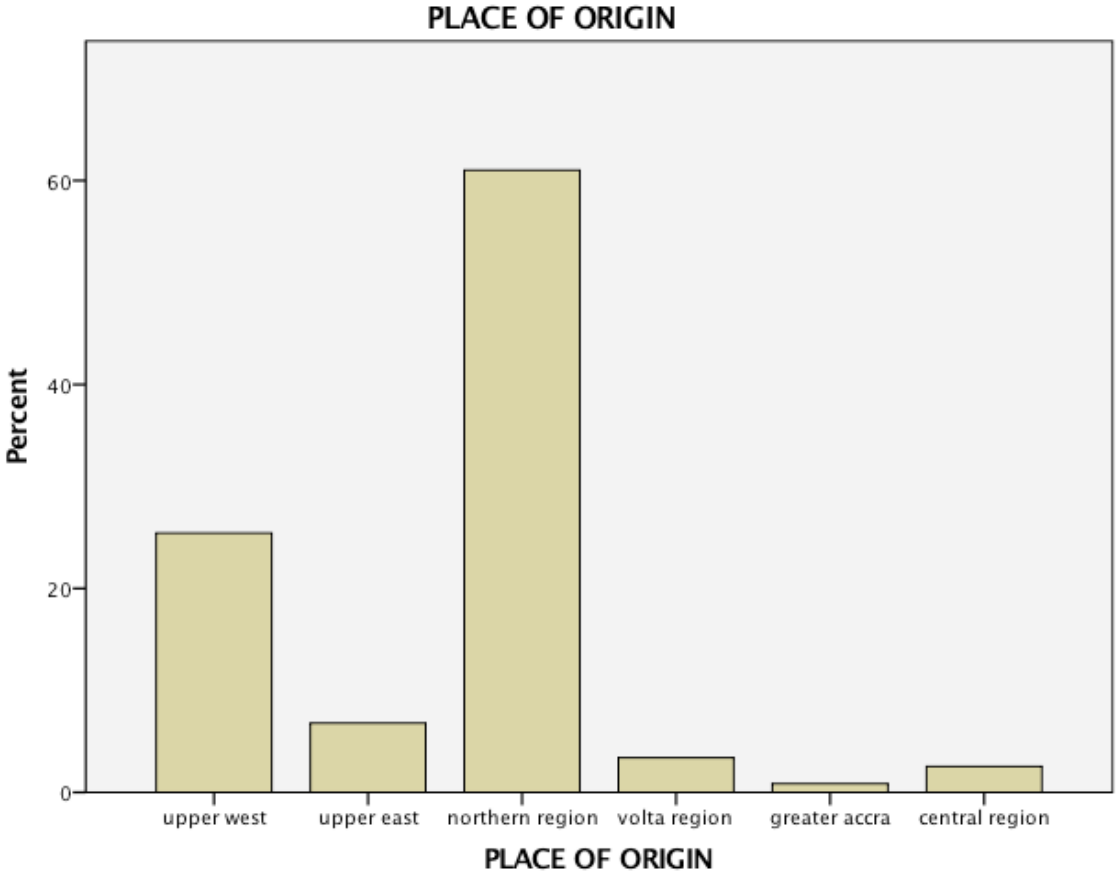

Figure 3: Place (geographical region) of origin among migrants

A close examination of the information on the time respondents had spent in Accra (as of the time of the interview revealed that majority of the migrants 85 out of 118 (72%) were neophytes and transitional migrants - while 68 (57.6%) had spent between one and eleven (1-11) months in Accra, 17 (14.4%) had lived in Accra between one and five (1-5). When we combined information about the place of origin with other variables such as the time of arrival in Accra (as of the time of the interview), whether this was migrants' first time in Accra, the time spent in Accra, and whether or not migrants had intentions of returning to their places of origin, the data revealed three different categories of migrants, namely, *seasonal migrants*, *first time migrants* and long-

term to permanent migrants. Whereas 69 of the 118 indicated that it was not their first time in Accra, 34 were in Accra for the first time and 15 had either grown up in Accra or lived there for a long time.

In other words, out of the 85 neophyte/transitional migrants in our study, only 34 (40%) were first time migrants. This means that 60% of the neophyte/transitional migrants may be classified as seasonal migrants. Indeed, when respondents were asked whether or not they had intentions of returning to their places of origin, an overwhelming 93% of the respondents answered in the affirmative.

The geographical region from which more than 90 percent of the migrants come, when combined with information about the type of migrants we identified affords us insights into the nature and patterns of migration among the seasonal migrants. Northern Ghana which has been the major source region of urban Ghana's migrants, experiences different climatic conditions compared to the regions in the south of the country and those along the coast. In the three regions constituting northern Ghana, farming is the major source of livelihood. However, the annual rainfall season has always been short, covering only between April and August. This period is followed by a long dry season, from September to March. During the dry season, most farmers would have harvested their crops and basically will have nothing else to do.

5.2 Linguistic challenges of Kayayei in urban markets Accra

The idea of the existence of possible linguistic challenges, especially among the seasonal and first-time migrants became very prominent during the fieldwork for the pilot data collection for this project. As we moved around in the market, we observed that the Twi dialect of Akan was the dominant language in the market. Our observation was confirmed by our respondents' self-report which indicated that 105 out of 118 (89%) of the respondents conducted business in Twi. However, as we interacted with the migrants, we observed that with the exception of the long-term to permanent migrants who spoke both their first language (L1) and a second languages (including Akan) fluently, all the others appeared to have linguistic challenges. Subsequently, during the fieldwork for the main data, we asked respondents directly whether they faced any particular linguistic challenges in their line of business. Out of the 118 participants, 63.2% answered in the affirmative while 36.8 said they had no particular linguistic challenges. Of those who had linguistic challenges, only 37.5% said they anticipated some linguistic challenge in their host community, 62.5% said they did not anticipate any such challenges.

As a way of verifying the information provided for this question, we elicited information about the L1s of migrants, any other language(s) they speak, and their preferred language for business in the markets. With regard to migrants' L1 background, only 3 (2.5%) of the respondents across all three markets indicated a dialect of Akan, Fante, as their L1. The remaining respondents had L1s other than the dominant language of the markets. Figure 4 below provides the specific L1 distribution of our respondents. It is important to note that some respondents indicated more than one language as their first language. A slash is put between such languages.

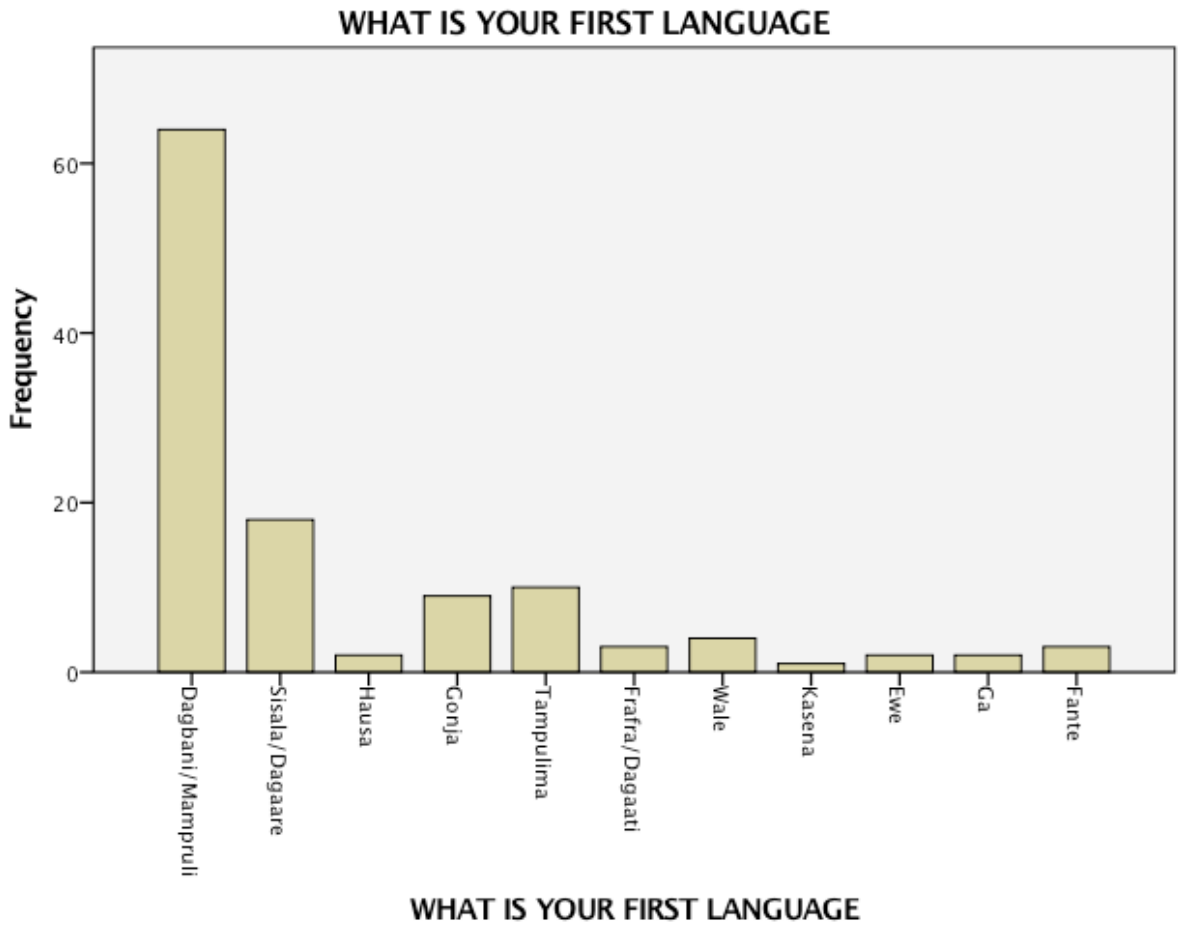

Figure 4: L1 distribution among *Kayayei* in urban markets in Accra.

Given the diversity of L1 backgrounds among the migrants, we may speculate that, one, not all of them get to do business in their L1, and two, at least, some of them are bilinguals. The data revealed that 83% of our respondents spoke a language other than their L1 in the markets for business purposes. Akan (Twi) was the dominant language spoken (77.1%) as L2 among the respondents. Table 1 below summarises migrants' responses to the question of additional language(s).

Table 1: Other languages spoken by migrants

Language	Frequency	Percent
Twi	91	77.1
English	4	3.4
None	16	13.6
Tampulima	2	1.7
Gonja	1	.8
Total	114	96.6
Missing NR	4	3.4
Total	118	100.0

From Table 1 above, we can see that even though Akan is a popular or dominant L2 among majority of the migrants, 22.8% of the respondents did not consider Akan as their L2 or a language they spoke for that matter. Given that Akan is a dominant language in the markets, we tried to find out what language migrants, at least those who did not have command of Akan, the language of the market, employed in conducting business in the markets. When this question was posed to the respondents, again Akan (Twi) emerged as the dominant language of business among migrants. It is interesting to note that the frequencies and percentages were higher here than they were for Akan as L2. What this reveals is that there are migrants who do not speak Akan as L2 but who choose to conduct business in the language (see table 2 below).

Table 2: The language migrants speak with clients

Language	Frequency	Percent
Twi	105	89.0
English	3	2.5
Gestures	6	5.1
None	1	8
Total	115	97.5
Missing NR	3	2.5
Total	118	100.0

When we asked respondents whether or not they already knew the language they speak with their clients before they migrated, 34.5% responded in the affirmative while 65.5% responded in the negative. Of the 68 migrants who had lived in Accra for less than one year, 47 indicated that they were bilingual in their L1 and Akan (Twi). Out of these 49 migrants, 42 (89%) reported to have learned it in Accra. The remaining 7 migrants were step-wise migrants, i.e. they had previously migrated to Kumasi, the capital of Ashanti Region where Twi is the native and dominant language. Again, out of the 17 transitional migrants, 13 (76%) indicated that they were bilingual in their L1 and Twi. Out of the thirteen (13), twelve (12) reported to have learned Twi from Accra while one (1) reported to have learned it from Kumasi. Finally, eighteen (18) out of the twenty-three (23) long-term to permanent migrants who reported being bilingual in Twi and their L1, 17 (94%) indicated that they learned Twi from Accra; only one of them reported as having learned it from Kumasi. Thus, we may argue that these markets appear to have become sites for learning Twi among these migrants, especially first-time migrants.

These notwithstanding, from our field experience with the *Kayayei*, the majority of those who claim to be bilingual in Akan and their L1 can only be described as incipient bilinguals – they appeared to know only essential phrases and formulaic language they needed to get by in the market. They could not sustain interaction in Akan outside core business discourse. However, it is worth noting the level of competence in Twi appeared to be constrained by the length of time a migrant had been in Accra or some other Twi-speaking community.

Finally, table 2 also reveals that migrants who do not speak Akan as L2 or L1 adopt some coping strategies in order to do business in these markets. The next section discusses these coping strategies.

5.3 Coping Strategies

From table 2 above, we can see that some migrants employ gestures in order to do business in the market. We also see the use of Akan (for business) by migrants who do not consider themselves as Akan speakers (compare tables 1 and 2). How is that possible? During the field work, we observed that many seasonal migrants who have been to the city once or twice have picked certain words, phrases, and sentences that pertain to their line of business (appropriate registers, e.g. come! let's go! how much?) to be able to engage in basic communication with customers (for business purposes) in the host communities.

Most migrants who do not speak Twi have found innovative ways of going around the problem. For instance, many first-time migrants who were new to both the physical and linguistic environment tend to move in groups, usually with someone who has some command of Akan, the main language of the markets. Such new migrants are

socialised into the working environment (including the language of business) in these groups. Even though there was little negotiation observed between porters and customers, on a few occasions, we observed some porters stepping in to offer linguistic assistance to colleagues (mostly first-time migrants) who were having a language problem with bargaining a price or understanding the destination the goods were to be carried to.

Again, during our fieldwork, we observed instances where a porter who spots a customer (but who could not speak Twi) would quickly call a Twi-speaking *Kayayei* to come and assist in interpretation. This is sometimes problematic as only few customers would allow such an arrangement. Most customers do not have the time and the patience for such arrangements. Consequently, most customers decide on porters who understand Twi. On other occasions, the porter who could speak Twi will rather jump at the opportunity to take up the job herself to the disadvantage of the non-Twi-speaking migrants. Thus, non-Twi-speaking porters in these markets appear to lose some business opportunities due to linguistic challenges.

Another coping strategy some migrants appeared to adopt to go around their linguistic challenges was to take whatever the customer says by nodding to avoid any linguistic interaction. This is how one respondent explained (through interpretation) how this strategy works for her:

> anything the customer says I would nod. So, at the end of the day I can't complain about whatever the customer decides to give me.

Another respondent explained that her initial way of dealing with the linguistic challenges of her job was to charge one Ghanaian cedi (GHS1) no matter the items to be carried and the distance to be covered.

> Whenever my services were needed, I would mention one cedi (GHS 1).
> My friends used to even call me One Cedi.

According to this respondent, there were instances when customers even felt pity for her and paid her more than the GHS1 she requested. At the time of the fieldwork, however, she was able to communicate with customers in Twi.

By far, the commonest procedure of getting work as a new porter who does not speak Twi was to always be with a *Kayayei* who was bilingual in one's L1 and Twi. A little over 30% of our respondents reported having stayed with their 'sisters' (biological or ethnic) upon first arrival. For such new porters, their 'sisters' become the medium of interaction between them and customers until they can operate on their own. However, we also observed that, not all customers at the market were Akan-speaking. For instance, in the Madina and Agbogboloshie Markets, some of the customers were themselves migrants from Ghana's north who are working in the formal economy especially as civil servants in government ministries and other state departments. Such customers

would usually speak their first languages which happened to be the L1 of some of the *Kayayei*, and thereby eliminate any linguistic challenge.

Whilst both seasonal and first-time migrants experience linguistic challenges, seasonal migrants, compared to first time migrants, had less linguistic challenges. Some of them (9%) are step-wise migrants. Before migrating to Accra, they had previously migrated to Kumasi, the second largest city in Ghana, and home to the Ashantis, with the largest number of speakers of the dominant dialect (Twi) of Akan. Such step-wise migratory practices enable migrants to learn some Akan before they arrive in Accra. Again, based on their previous migration to the city and their study of the market environment within which they work, the migrants reported that one needed very basic linguistic requirements to function in the informal economy of Accra.

For instance, it became obvious in our interaction with these migrants during the fieldwork that these female migrants do not need in-depth knowledge in the local language to have a successful business transaction with customers.

Per their main task of carrying goods from one point to another for a fee, the basic exchanges were first of all getting a customer (either by hand gestures) beckoning to a waiting porter, or calling out with the most popular and waiting-to-be-heard Akan word ***bra*** 'come'. Immediately, a porter approaches the customer who points out the goods to be carried and continued in Akan ***sɛn?*** 'How much' or ***wobɛgye sɛn?*** 'how much will you charge?'. At this juncture, the customer could quickly add the name of the destination to which the goods would be carried. Since these migrants have sufficient knowledge of the various lorry stations (bus terminals) and spots near and around the market, they are able to access the size of the goods and the distance to be covered, and negotiate the fees with the customer. Alternatively, the customer could just point to the goods, the porter carries them to the destination of the customer before fee negotiations commence. In either scenario, very minimal linguistic exchange is required and therefore, very little linguistic knowledge may be sufficient to conduct business (in their line of work).

It is of interest to note that while all the strategies discussed above were reported to be used by the *Kayayei*, the data revealed that learning the appropriate registers (key vocabulary) needed to transact business was the most employed strategy. Indeed, the data revealed that 91.3% of the migrants who used Akan to do business learned it in Accra. Combining this finding with the finding that an overwhelming majority of the migrants (72%) had lived in Accra for between one month and thirty-six months, we may conclude that the level of competence in Akan can barely go beyond that of incipient bilinguals.

In trying to explore why migrants chose to do business in a language they had very little competence in, we posed this question to them 'why did you learn this language?' Table 5 below summarises the responses of the migrants:

Table 5: why migrants learn language of the market

Reason	Frequency	Percent
To communicate properly with clients	58	49.2
To communicate with people in general	25	21.2
I just learnt it	13	11.0
It is prestigious to speak Twi	1	.8
Total	97	82.2
Missing NR	21	17.8
Total	118	100.0

From Table 5 above, it is clear that the most obvious reason for learning Akan (Twi), the language of the market is economic (to communicate with clients). Indeed, during the fieldwork, we were told by one long-term migrant that some time ago, due to linguistic challenges, the *Kayayei* used to carry goods without any verbal communication or negotiation with customers and customers used to throw few coins at them when they got to their destinations. Some dissatisfied *Kayayei* resorted to insults in their first languages, most likely to the understanding of nobody except themselves and colleague *Kayayei* standing by whilst angry customers either insulted back in their own languages or beat the *Kayayei* up where they could. Thus, most *Kayayei* became dissatisfied with this exploitative situation and thus, decided to learn Akan, the dominant (working) language in urban Ghana.

One of our respondents sums up the main reason for their learning of Akan in the following submission (as captured by the field workers):

> Sometimes when you are in a group and a customer approaches and speaks Twi, anyone who first responds is the one who is hired. So, you can be in a group of fellow other porters but only those who can speak a little [minimal] Twi get work always and this makes me think a lot.

6. Conclusion

In this paper, we have discussed the language-migration nexus among female migrants (mainly from northern Ghana) in three urban markets in Accra. The study has revealed that an overwhelming majority of the migrants are from the three northern regions of Ghana, namely, Northern Region, Upper East Region and Upper West Region. Again, we found out that the majority of these migrants are between the ages of 10 and 29 years old, and that in spite of the Free, Compulsory, Universal Basic Education (from Primary to Junior High School) policy practiced in the country, 93.9% of these migrants have either had no formal education at all or at best, have had it up to

primary level, not completing Basic Education. Again, we found out that majority of the migrants we studied were seasonal migrants and transitional migrants from diverse ethnolinguistic backgrounds.

As anticipated, many of these migrants have linguistic challenges. But more interestingly, the study has revealed that while the majority of these migrants have linguistic challenges in the host communities (in the markets) because the dominant language of the market was not known to them prior to their migration, they have developed several strategies to cope with these challenges. The commonest of these coping strategies was incipient bilingualism. In all, 98 (86%) of the respondents self-reported being bilingual in their L1s and other Ghanaian languages as well as English. Of the 98, whereas 91 (93%) indicated that they were bilingual in their L1s and Twi, 4 reported being bilingual in their L1s and English and 3 in their L1s and other northern languages.

For those who reported being bilingual in their L1s and Akan, we realized that the level of competence in Akan depended on such factors as the time spent in Accra, and the type of migrant (step-wise, first-time, seasonal, long-term, etc.). It became apparent that the longer the period of stay in Accra, the more competent migrants tend to be in Twi. Again, step-wise and long-term to permanent migrants appeared to have more competence than seasonal and first-time migrants. Nevertheless, majority of our respondents (who are seasonal, neophytes or transitional) appeared to have learned key vocabulary that is needed to do business in Twi, the language of the markets.

The main motivation for becoming incipient bilinguals, the data revealed, is economic. According to Choi (2014:123), immigrants would normally pursue social mobility or assimilate into host societies by means of educational achievement but in 'order to effectuate such upward social mobility into host society, second language acquisition is usually necessary'. Nevertheless, questions regarding first language retention and second language acquisition and the extent to which migrants achieve either, is contingent upon whether or not migrants intend to make the place of destination their home. Since majority of our respondents are seasonal, and therefore temporary migrants, this is expected - their linguistic habits in the host communities are consistent with their status as temporary migrants.

In other words, it is this seasonal/temporary nature of their stay in the host communities which explains their attitude to the second language, which they speak only at work. Outside of work, the migrants form linguistic islands and communicate with colleague migrants in their L1s. Indeed, within the first few months of arrival in the markets, we were told, first time migrants walk with seasonal migrants or those who have been there for long time not only to understand the working environment in terms of the names of places such as certain popular buildings, government establishments, restaurants and drinking spots, and lorry stations, but also to know the pricing of goods, to

pick up essential words, phrases and sentences in preparation towards engaging in independent head porterage. Most, if not all these female head porters depend on other porters upon their first arrival for assistance in language and other matters such as financial, accommodation and company during the day.

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SUBORDINATION ACROSS GHANAIAN AND BRITISH NEWSPAPER EDITORIALS: A REGISTER PERSPECTIVE

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Abstract

This is a corpus-based empirical study which argues in the light of the register theory that grammatical categories are functional and relate to their situational context of use. Using editorials from Ghanaian and British newspapers, this paper examined the usage dynamics and the functional motivations behind the use of subordinate clauses in the editorial register. Clause subordination in this study is argued to offer the opportunity for idea expansion. Limiting the focus to functional clauses, it was found that though there are enormous patterns of similarity in the distribution of the three functional clause-types across the variable sociocultural contexts studied in line with claims by register theory, some distributional inconsistencies exist in the details of the subtypes of some of the functional clause-types. The results revealed that nominal clauses are consistently preferred across newspapers from the two sociocultural contexts, followed by relative clauses; an observation that led us to conclude that the nominal clause is indispensable to the editorial register because it performs elaboratory functions necessary for editorial communication. The findings of this cross-cultural study generally enhance our understanding of the language of newspaper editorials as well as the sociocultural variations that exist in the newspaper editorial genre.

Keywords: Newspaper editorials; Register; Functional clause-types; Systemic functional linguistics; Context; Nominal clause

1. Introduction

The crux of register theory is that linguistic features perform communicative functions relevant to the situational context of a given register (Halliday & Matthiessen, 2004; Eggins, 2004; Biber & Conrad, 2009). The argument is that within

a particular genre, linguistic features perform similar communicative functions even across dialects of the same language (Biber & Conrad, 2009). Empirical research in this area is scanty, though this theoretical argumentation is not without contention, especially cross-culturally. Empirical investigation is therefore necessary to validate the claim that people of varied socio-cultural backgrounds may use language in similar quantitative proportions within similar situational contexts. This study fills this gap. It examines the use of subordinate clause-types in editorials across Ghanaian and British newspapers. The aim is to ascertain the distributional behaviour of the three main subordinate clause-types (nominal, relative and adverbial clauses) and to explore what functional motivation influences their distribution. The study revolves around the following research questions:

- How are subordinate clauses distributed in editorials across the newspapers from the two sociocultural contexts?
- What are the co-textual properties of the dominant clause patterns?
- What functional motivation underlies the distribution of dependent clause patterns in newspaper editorial register?

2. Register: The interface between language and context of situation

Halliday and Matthiessen (2004) define register as

> …a functional variety of language (Halliday, 1978) – the patterns of instantiation of the overall system associated with a given type of context (a situation type). These patterns of instantiation show up quantitatively as adjustments in the systemic probabilities of language; a register can be represented as a particular setting of systemic probabilities (Halliday & Matthiessen, 2004, pp. 27 - 28).

This perspective of the register theory is a systemic functional perspective which emphasizes the situational context, the quantitative representation of linguistic features and the probabilistic instantiation of linguistic features[1]. Thus, the linguistic features investigated in register studies are features common to all texts. Their significance, however, is in their quantitative impression. That is, dominance of particular linguistic features and, especially in cross-cultural studies, similarity in the patterns of distribution of linguistic features are deemed functional.

[1] The probabilistic instantiation of linguistic features in register theory is one of the features that distinguish register theory from genre theory whose linguistic features are indexical (Biber & Conrad, 2009).

To systemic functional linguistics (SFL), the situational context is examined through the register variables of field, mode and tenor, where:

- *Field* refers to the domain of language use (Eggins, 2004);
- *Mode* refers to the channel of communication and the effects of the channel on the communication (Martin, 2010, p. 22); and
- *Tenor* refers to the relations between participants in a communicative event reflected through linguistic choices (Eggins, 2004).

But these theoretical positions are not unique to SFL. Elsewhere, Biber and Conrad (2009) make similar arguments. In their framework of register analysis, Biber and Conrad (2009) argue that though register and genre are both functional theories, whereas a genre-based theory focuses on the staging of texts and indexical linguistic features, register-based theory expounds on the probabilistic linguist features which are functional in quantitative terms. What is noteworthy about their framework is that the situational context is broken down into seven sub-features, which are argued to influence text production in varying degrees.

According to Biber and Conrad's, a register approach should essentially involve a description of the situational features of the register investigated. But this is just the first of a set of three components of their register framework. The other two are a description of the pervasive linguistic features and "a functional analysis" of the correlation between the dominant linguistic features and the situational features of the register (Biber & Conrad, 2009, p. 6).

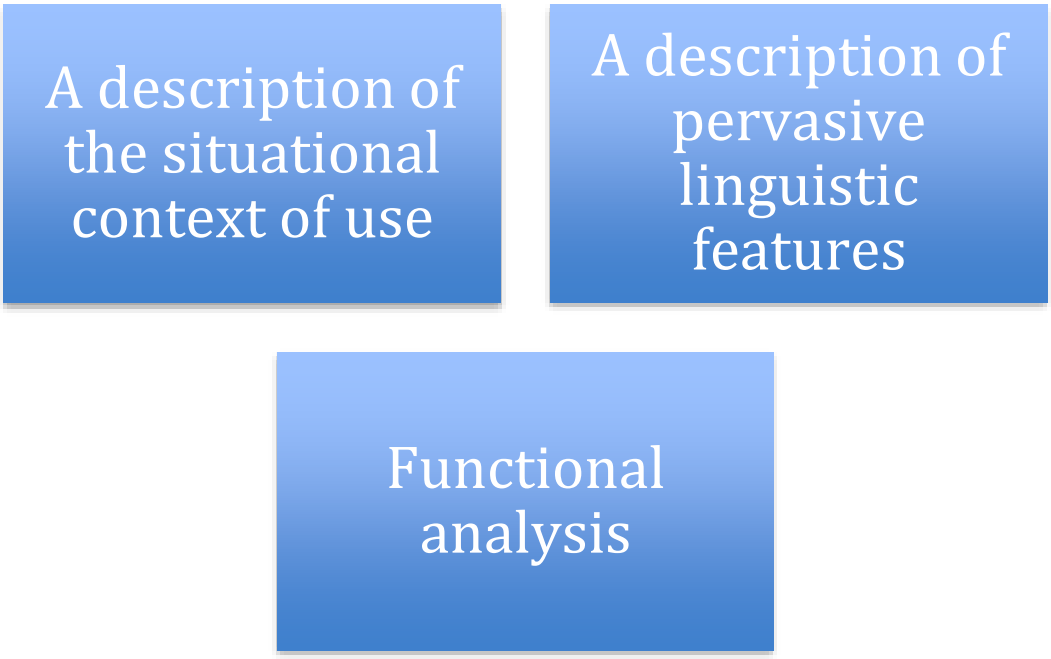

Figure 1: The Components in a register analysis

2.1 The two perspectives of Register

Two perspectives of register that are prominent in the literature are Biber and Conrad's (2009) functional perspective and Hallidayan SFL perspective (Eggins, 2004; Halliday & Matthiessen, 2004). Whereas register from the Hallidayan perspective is conducted by examining how language use in a particular situation reflects the register variables of *field*, *mode* and *tenor*, Biber and Conrad (2009) analyze the situational background of the variety in question, the linguistic characteristics and the functional relationship between the situational context and the distribution of linguistic features. This plan of engagement is captured in the following:

> The description of a register covers three major components: the situational context, the linguistic features, and the functional relationships between the first two components…" (Biber & Conrad, 2009, pg. 6)

The situational context is made up of the following seven sub-features, which, according to Biber and Conrad (2009), relate to varieties of a language in varying degrees:

1. the background of participants of the communication,
2. the relationship between participants,
3. the channel of communication,
4. the setting,
5. the production and comprehension circumstances
6. the communicative purpose, and
7. the topic

The position of this study is to consider the two models of register as complementary. It is argued in this study, that the situational characteristics of Biber and Conrad's model offer a detailed explanation to Halliday's register variables. One observes that the *field* is roughly relatable to the topic, communicative purpose and setting of Biber and Conrad's situational variables. *Mode*, on the other hand, relates to the channel of communication and the production and comprehension circumstances, while, *tenor* corresponds roughly to participants and relations among participants.

To start with, though the topic of a text may be general, it always directs attention to the field of the discourse. A newspaper editorial, for instance, always relates to a particular discipline or human activity and as a result, editorialists' choice of words, in particular, indicates the field of the discourse. For, as Wiredu (2012, p. 77) argues, "…there is a link between language choices in the editorial and its intended function of persuading a targeted audience." Thus, regardless of the topic, an editorial always has one central communicative purpose: that of influencing societal perception and it is this communicative function that practically drives the production of a variety.

In this study, the communicative purpose is considered important since it is one of the features that normally influences grammatical choices (Biber & Conrad, 2009, p. 46). It is generally argued in the literature that newspaper editorials perform the communicative function of persuasion, advocacy, benchmarking and agenda setting (Biber, 1988; Van Dijk, 1989; Wiredu, 2012).

One can again draw a correlation between Biber and Conrad's channel of communication and production and communication circumstances and *mode* of Hallidayan register variables. First of all, a particular channel of communication influences the production and comprehension circumstances. For instance, since the production of a written text involves careful planning and editing, written varieties are generally more linguistically complex. This complexity, correspondingly, requires a careful reading for comprehension. Conversely, the limited time for spoken

communication conditions spoken texts to be relatively linguistically loose. The *mode* in SFL covers roughly the same scope dilated in Biber and Conrad's model.

The *mode* is as relevant to our understanding of newspaper editorials as the communicative function. In fact, it is one of the most important physical situational contexts. In the first place, newspaper editorials, like any other written genre, are composed under situational conditions that make them linguistically complex. Though they are written under the strictest conditions of satisfying their audience and working within the philosophies of the newspaper, there is some time for both planning and editing. The opportunity to plan and edit their texts gives editorialists room enough to make the right linguistic choices in the fulfilment of their mandate of persuading their reading public. There are, equally, some effects of the comprehension circumstance on the composition of editorials. Editorialists are aware of the lack of contact with their audience. This awareness calls for explicitness and elaboration in the use of language. In this regard, it is unsurprising that complex sentences, for example, are noted to be the dominant structural sentence types in newspaper editorials (Wiredu, 2012; Frimpong, 2015).

Finally, it is argued in this work that Biber and Conrad's participants and relations among participants relate perfectly with the tenor of the SFL framework. This is because an investigation of the background of participants of a discourse can explain linguistic choices, which may indicate the power relations between participants of the communication. In newspaper editorials, the addressor is unidentified. Its audience is unspecified – involving people of varying backgrounds. The effect of these on editorials is a tendency for them to be impersonal, especially in the choices of pronominals and other referential features.

It must be noted that Biber and Conrad's (2009) register framework is one of the most developed models in the literature in the sense that it has a more detailed plan about how to conduct a register study. For instance, apart from establishing the three legs of register analysis (c.f. section 2 above), they break down into specific details what constitute the situational context, outlined above. This is not the case with the Hallidayan model whose register framework is developed into the register variables – field, mode and tenor. It seems that because the register variables are dovetailed into the more developed metafunctional theory of SFL, not much effort is done about outlining how to conduct research using their register framework. Thus, though their conceptualization of register (c.f. Halliday & Matthiessen 2004) touches on the core tenets of the theory such as the situational contexts, functional motivation, quantitative instantiation of linguistic features, detailed in Biber and Conrad, they do not delve further into how textual analysis is conducted using their register model. This is how Halliday and Matthiessen (2004) define register:

> A register is a functional variety of language (Halliday 1978) – the patterns of instantiation of the overall system associated with a given type of context (a situation type). These patterns of instantiation show up quantitatively as adjustments in the systemic probabilities of language; a register can be represented as a particular setting of systemic probabilities (Halliday & Matthiessen, 2004, p. 27,28)

And this is why theoretical emphasis in this work is given to Biber and Conrad's model.

2.2 The Newspaper editorial genre

Though earlier works have tended to treat the newspaper editorial as a subset of a monolithic newspaper genre, often referred to as journalese (c.f. Crystal & Davy, 1973; Fowler, 1991; Bhatia, 1993), many recent studies have argued for a newspaper editorial genre which is distinct from the other subgenres of the newspaper (Bolivar, 1996; Ansary & Babaii, 2009; Westin & Geisler, 2002; Wiredu 2012; Kuhi & Mojood 2014). Thus, Ansary and Babaii (2009) argue that the newspaper editorial is a unique genre whose qualities can make it an exemplar for both media studies and writing in English as a Second Language (ESL) classroom. Ansary and Babaii (2009) undertook a cross-cultural study of editorials from Pakistani, Iranian, and American newspapers from systemic functional perspectives, with a specific focus on the generic structure potential of those English newspaper editorials. They discovered that newspaper editorials across the three socio-cultural contexts were made up of the same number of obligatory and optional generic rhetorical elements.

Westin and Geisler's (2002) investigation of editorials from British newspapers (focusing on *The Daily Telegraph*, *The Times* and *The Guardian*), for instance, explores the language of editorials from diachronic perspectives, using Biber's (1988) multidimensional model. Though their diachronic corpus revealed some linguistic and stylistic variation between the *Guardian* and the other two newspapers (the *Daily Telegraph* and *The Times*) they found that British newspaper editorials generally became more argumentative during the 20th century. Their additional observation that editorial texts relied less on complex postmodification is something worth investigating.

One of the most recent investigations of the editorial genre (Kuhi & Mojood, 2014) examines the use of metadiscoursive features across American and Persian newspaper editorials. They discovered that though cultural differences reflected in some differences in the distribution of some metadiscoursive features, generic factors

influenced major similarities in metadiscoursive patterns across the two socio-cultural contexts.

One important observation throughout the literature is that though work in the literature explores the editorial from varied linguistic perspectives, none of them has paid particular attention to the clause, even though there is the register argument that one can establish a correlation between these grammatical choices and their situational context (Eggins, 2004; Halliday & Matthiessen, 2004; Biber and Conrad, 2009). Wiredu's (2012) exploratory study investigated the complex sentence in newspaper editorials and paid some attention to the clause. However, he focused only on a single Ghanaian newspaper (the *Daily Graphic*). Granted that the clause is "the major unit of grammatical analysis" (Bloor & Bloor, 2004, p. 8) the silence on it creates a major gap that this study seeks to fill.

It is noteworthy that throughout the literature reviewed, the features investigated reveal huge similarities across cultures – evidence that the newspaper editorial is a distinctive genre which does not exhibit major cross-cultural variability. And this is what was meant when Biber and Conrad argued that

> Regardless of any dialect differences, speakers using the same register are doing similar communicative tasks; therefore in most basic respects the characteristic language features used in a given situation are similar across speakers from different dialects (Biber and Conrad, 2009, p. 12)

So far, no study has compared Ghanaian newspaper editorials with British editorials; neither has there been any investigation into the functional motivation behind the selection of subordinate clause-types in newspaper editorial genre. And these equally constitute research gaps that motivate this study.

Besides, the English used in Ghana has evolved into its current state since it was first introduced into the Gold Coast by the British colonialists. Investigations like these help gauge how far the Ghanaian variety of English has developed apart from its historical source. Besides, since there is an argument in the literature that strategic use of linguistic features can aid effective use of communication, it is hoped that our study will enable us to gauge some of the useful linguistic features that help editorial writers to achieve the communicative purpose of the newspaper editorial.

3. Methodology

3.1 The Corpus

The corpus for the study is made up of 144 editorial texts culled from 4 English newspapers from Ghanaian and British newspapers. From Ghana, the *Daily Graphic* (DG) and *The Ghanaian Times* (GT) were selected and from Britain, *The Daily Telegraph* (DT) and *The Times* (TT) were chosen. Each of these newspapers was produced during 2012. These four newspapers were chosen because they are similar in some ways. The two Ghanaian newspapers are among the most circulated and popular national daily newspapers in Ghana (Yankson et al., 2010). Besides, because both newspapers are state owned public newspapers, their management is deemed capable of employing competent professionals who can produce quality newspapers. It is in the light of these that Fosu (2016, p. 6) identifies these two newspapers among the "most dominant, credible and influential quality publications in Ghana." These are some of the qualities that make the two newspapers the most comparable with the two British newspapers, which are among the top-quality broadsheet national British newspapers (Westin & Geisler 2002). Information about the corpus is summarized in Table 1 below.

Table 1: Background information about the corpus

	DG	**GT**	**DT**	**TT**	**TOTAL**
Number of Texts	36	36	36	36	**144**
Number of Sentences	700	534	774	1118	**3126**
Number of words	17666	14004	18027	21925	**59022**

As can be seen in Table 1, though the same number of editorial texts was selected across the four newspapers, the total number of words varies from one newspaper to another. This is because the editorial texts vary in length (i.e. in terms of the number of words per text) with the GT having the least number of words. To ensure comparability, normalized percentage rates were calculated for the analysis.

3.2 The Analytical framework

This is an empirical study which combines qualitative and quantitative methods in a textual analysis. The decision to combine quantitative and qualitative methods was inspired by Biber (1988) who finds complementary strengths in their joint application in the sense that "[Q]uantitative analysis gives a solid empirical foundation to the findings" while "non-quantitative analyses are required for the interpretation" (Biber, 1988, p. 52).

The 144 editorial texts from the four Ghanaian and British newspapers produced during 2012 were analysed using Biber and Conrad's (2009, p. 6) register framework. These include:

1. Describing the situational context of the genre
2. Describing the typical linguistic features, and
3. Establishing the functional correlation between the situational context and the dominant linguistic features.

The situational context of newspaper editorials has been described in section 2.2 above. The rest of the work focuses on the last two stages of Biber and Conrad's (2009) framework outlined above. Since distributional patterns are compared across two sociocultural contexts, a Chi-square test of independence was adopted using the Pearson's critical value of 0.05.

4. Distribution of clause types

The three functional clause-types attested in the editorial corpus fulfil subject, object and complement functions (Greenbaum & Nelson, 2002, p. 128), post-modifying and adverbial functions (Hopper & Traugott, 2003, p. 177). These functional types of clauses are distributed in the editorial corpus as captured in Table 2 below.

Table 2: Distribution of clause-types

	DG (%)		GT (%)		DT (%)		TT (%)	
Nominal	463	(42.67)	302	(43.39)	480	(45.49)	587	(46.25)
Relative	350	(32.25)	230	(33.04)	317	(30.04)	381	(30.33)

Adverbial	272	(25.06)	160	(22.98)	258	(24.45)	301	(23.71)
	1085	**(100)**	**696**	**(100)**	**1055**	**(100)**	**1269**	**(100)**

(**x^2 =0.4, *p*-value = 0.09**)

The results in Table 2 show a high consistency in the distribution of clause types across the four newspapers. These results indicate, first of all, that the clauses are distributed independent of newspaper type. This observation is confirmed by results of the chi square test (x^2 =0.4, *p*-value = 0.09). It is observable in this table that nominal clauses are the most preferred clause type across the four newspapers at 42.67%, 43.39%, 45.49% and 46.25% for DG, GT, DT and TT, respectively. Relative clauses are the second most attested clause-types followed by adverbial clauses.

The congruence in distribution among the functional clause-types cannot be taken for granted. In fact, it is basically the first indication that these clauses are functionally relevant to the editorial register. This claim seems supported by the distributional intervals among clause types as evidenced in Figure 2 below. We notice, for example, that each clause type is significantly represented in such a manner that no one particular clause type enjoys an absolute dominance. Additionally, there is a seemingly regulated variation in the distribution of clause patterns across the newspapers (c.f. Figure 2 below).

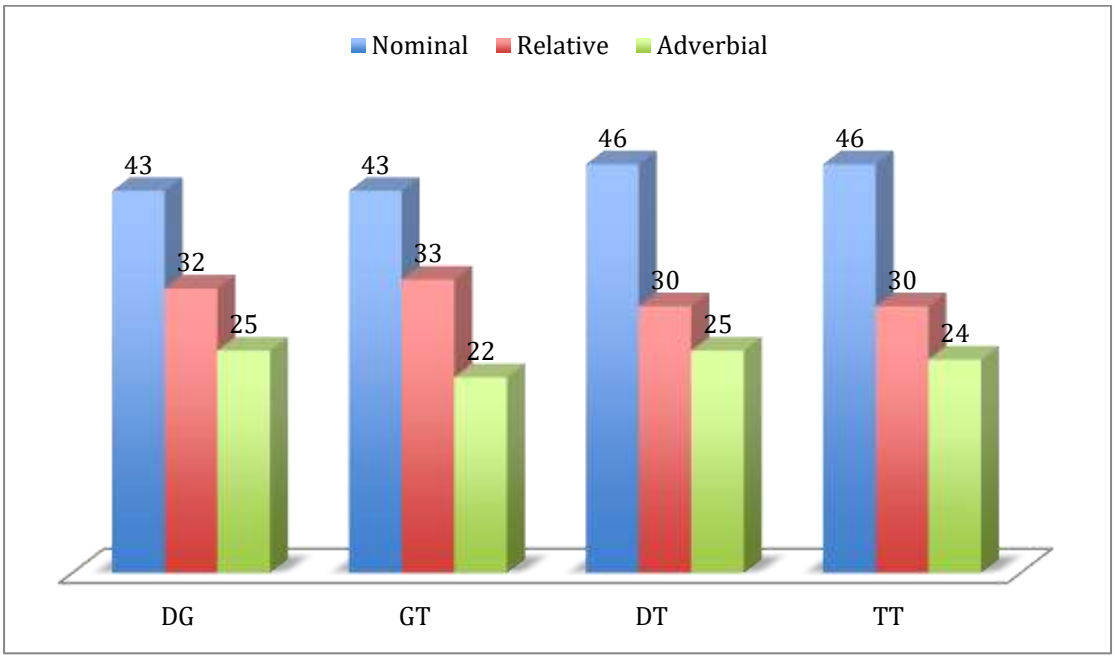

Fig 2: Distribution of Functional Clause Patterns

We can therefore argue, based on this information, that there is something beyond newspaper type which influences the choice of clause patterns in the newspaper editorials. This is the phenomenon we intend to explain using register theory. That is, there is a degree of quantitative consistency in the distribution of linguistic features in newspaper editorials, and the distribution of the clause patterns may be just one area. This observation is consistent with Halliday and Matthiessen (2004) who argue that quantitative consistency is a function of a situational context.

The question is, what communicative functions does each of these clauses perform and how do they contribute to the achievement of the communicative purpose of the newspaper editorial register? Besides, how relevant, one wonders, are the distributional patterns of these clause types to the situational context of newspaper editorials.

In the first place, it must be said that the three clauses captured in Table 1 above are generally used to realize the discourse function of expansion (Halliday & Matthiessen, 2004; Downing & Lock, 2006) – a function that is congruent with the discourse function of editorials. That is, in their mandate of influencing public perception and attitudes (Van Dijk, 1989; Bolivar, 1996), adequate information needs to be skilfully packaged into the editorial text for them to be as persuasive as possible.

Structural devices for realizing expansion, therefore, become more functional than stylistic in a variety such as newspaper editorials.

However, each clause-type in turn performs a specific expansive function. And this is what seems to motivate their unique distributional behaviour in the editorials. For instance, the nominal clause is argued to perform functions of elaboration (Wiredu, 2012). This is a situation where an embedded nominal clause is either a clause element (say subject) performing clarification functions as in sentence (1) below or a complement performing a specificatory function within a noun phrase as in sentence (2) below.

1. ***Raising that number* will be very tough given the huge amount of investment that other countries are putting into universities in general, and science in particular, especially in Asia. <clause text="TT01" snumber="20" cnumber="21">**
2. **There is also an argument *that the devolution of decision making in the NHS did not require a structural overhaul, but rather a low-key, managerial approach*. <clause text="DT05" snumber="08" cnumber="12" >**

Similarly, the relative clause performs a specification function of elaboration within a noun phrase. By elaboration, therefore, an idea is clarified, refined, restated or exemplified in a new clause (Halliday & Matthiessen, 2014, p. 469). Thus, the italicized relative clauses in sentence (3) below perform elaboration functions of specification.

3. **That is why…every Ghanaian *who has a stake in the future stability and peace of the country* must conduct himself/herself in a manner *that enhances our credentials as a beacon of hope* on a continent *where some countries are struggling from the ashes of war*. <clause text="DG01" snumber="06" cnumber="11, 12, 13" >**

Finally, adverbial clause types realize enhancement functions; functions by which circumstantial information such as the location, purpose, time, reason, etc., for an event or activity (Halliday & Matthiessen, 2004) may be relayed. Clause enhancement, represented in Table 1 above is the least attested across the four newspapers. In sentence (4) below, for instance, enhancement has been realized through an adverbial clause of concession.

4. ***Although 16 MPs are reported to have lost their seats to some Ministers of State and assemblymen,* the primaries were devoid of any nasty incidents.**

<clause text="GT03" snumber="03" cnumber="03" function="concessive adverbial" structure="subordinating">

It is reasonable to argue that the predominant representation of nominal structural patterns in the editorial texts across the two cultural contexts suggests that elaboration is of a paramount necessity in newspaper editorials. It must be noted that relative clause patterns are sub-features of nominalization. They are realized within a nominal phrase within which they give detailed specificational information. And they themselves express elaboration. This implies that there is an attempt in newspaper editorials at not just achieving elaboration with language but also at being specific about information conveyed.

It must be noted, however, that elaboration, specification and enhancement are broader functions, which are instantiated through a variety of sub-functions relative to particular clause-subtypes. And so, the next stage of the study, in line with the register theory, (c.f. Biber & Conrad, 2009, p. 6) investigates the distributional and usage patterns of the dominant clause-types.

5. The Nominal clause

It has been noted that the most prevalent clause throughout the four newspapers is the nominal clause. The following nominal clause patterns are observed in the corpus:

5. *THAT*-clauses functioning as subject of a sentence or as complement within an NP, a VP or an ADJP;
6. *WH*-clauses functioning in subject positions, in subject complement positions or in object positions; and
7. *INFINITIVAL*[2]-clauses functioning as subjects of sentences or as complements within NPs, and ADJPs.

These patterns above are the structural patterns, which fulfil *nominal*, *verbal* and *adjectival* clause complementation. These three subtypes of the nominal clause are distributed in the corpus as follows:

[2] By infinitival clauses one implies nonfinite clauses whose verbs are in the infinitive form.

Table 3: Distribution of nominal clause sub-types

	DG (%)		GT (%)		DT (%)		TT (%)	
Nom compl	282	(60.90)	167	(52.29)	217	(45.20)	320	(54.97)
Verbal compl	135	(29.15)	86	(28.47)	191	(39.79)	164	(27.65)
Adj compl	46	(9.93)	49	(15.23)	72	(15)	103	(17.36)
	463	**(100)**	**302**	**(100)**	**480**	**(100)**	**587**	**(100)**

(x^2 =7.4, *p*-value =0.2)

From this table, it is obvious that the nominal complement subtype is the most preferred nominal clause across the four newspapers. Observably, there is no affinity in the distribution of the nominal clause subtypes between newspapers from the same country. The implication of this pattern of distribution is that, there is no regional/dialectal differentiation in the distribution of the nominal clause subtypes and that any variation observed across the newspaper types is statistically insignificant (x^2 =7.4, p-value = 0.2).

Typical nominal complements are instantiated in the sentences below, functioning as complements of noun heads (as italicised in sentence (5)), as subjects (as italicised in sentence (6)) or as subject complements (as italicised in sentence (7)):

8. **There is also an argument *that the devolution of decision making in the NHS did not require a structural overhaul, but rather a low-key, managerial approach*. <clause text="DT05" snumber="08" cnumber="12">**

9. ***To take on the major charities* is to begin a battle the Government cannot and should not win. <clause text="TT12" snumber="14" cnumber="13" >**
10. **The truth is *that the Budget process revealed a serious breakdown in the usually smooth communication between No 10 and No 11 Downing Street*. <clause text="TT12" snumber="10" cnumber="08">**

From the corpus, we observe that clauses which perform these functions are mainly *THAT*-clauses, *INFINITIVAL* clauses and *WH*-clauses. *WH*-clauses, however, recorded very low attestations in the corpus across the four newspapers (i.e. 8%, 7%, 7%, and 10% for DG, GT, DT and TT, respectively) as shown in Table 3 below.

Table 4: Structural patterns of nominal clause in the editorial corpus

	DG (%)		**GT (%)**		**DT (%)**		**TT (%)**	
***THAT*-clauses**	282	(61.17)	186	(61.71)	277	(57.82)	304	(52.32)
INFINITIVAL	140	(30.36)	95	(31.35)	169	(35.28)	219	(37.69)
***WH*-clause**	39	(8.45)	22	(7.26)	33	(6.88)	58	(9.98)
	461	**(100)**	**303**	**(100)**	**479**	**(100)**	**581**	**(100)**

(x^2 = 2.7, *p*-value =0.8)

The implication of these distributional patterns is that, in terms of their internal structure, the nominal clauses attested in the editorial corpus are predominantly *THAT*-clauses followed by infinitival clauses. The harmony in the usage patterns having *THAT*-clauses as the preferred type across the four newspapers followed by *INFINITIVAL* clauses, is crucial to the register theory. This confirms one of the central claims supported by register theory:

> Regardless of any dialect differences, speakers using the same register are doing similar communicative tasks; therefore in most basic respects the characteristic language features used in a given situation are similar across speakers from different dialects (Biber & Conrad, 2009, p. 12).

Equally noteworthy is the observation that nominal clauses used in the four newspapers are predominantly rank shifted as complements within phrases. In this regard, clauses functioning as subject, as italicised in the following example, are very few in the corpus:

11. ***To have proposed and brought forward a significant change in the constitution of local government,*** **but then** ***to have failed to pursue the argument with any vigour*****, will be a critical failure. <clause text="TT14" snumber="10" cnumber="14">**

The distributional patterns captured in Table 5 below were observed in the corpus.

Table 5: Distribution of nominal clauses in subject and complement positions

	DG (%)		GT (%)		DT (%)		TT (%)	
Subject	50	(10.79)	19	(6.29)	38	(7.91)	80	(13.62)
Complement	413	(89.20)	283	(93.70)	442	(92.08)	507	(86.37)
Total	**463**	**(100)**	**302**	**(100)**	**480**	**(100)**	**587**	**(100)**

The overwhelming preference for clauses in complement positions is as relevant to register theory as the uniformity in the distributional patterns. Post phrasal clause complementation is, actually, the most preferred pattern across the four newspapers with the frequency attestations of 89%, 94%, 92%, and 86% for DG, GT, DT and TT, respectively. This indicates that in the editorial register, clause elaboration is realised mainly through the strategy of complementation. By complementation, ideas realised by clause structure are rank shifted within phrases. By rank shifting, information is strategically packaged to achieve compactness, a strategy which seems relevant to the communicative function of newspaper editorials (Wiredu, 2012).

One equally observes that complementation after nouns, verbs and adjectives is typically realized by *THAT*- and *INFINITIVAL*-clauses in the corpus. Especially for *THAT*-clauses (the most attested in the corpus), we identified typical examples such as the ones italicized in the following excerpted sentences which instantiate verbal, nominal and adjectival complements.

12. *THAT*-clause as complement within a verb phrase:

This newspaper has argued *that the strategy must be more ambitious for Britain*…. <clause text="TT01" snumber="04" cnumber="03">

13. *THAT*-clause as complement within a noun phrase:
    Combine that with the aggressive intolerance of the militant secularists, and it is little wonder *that the Church of England frequently feels beleaguered.* <clause text="DT06" snumber="11" cnumber="17">

14. *THAT*-clause as complement within an adjectival phrase:
    We are delighted *that in anticipation of a very exciting political season, the government has come up with a code of ethics*… <clause text="DG04" snumber="06" cnumber="12">

In these three sentences above, the ideas conveyed by the verb *argue*, the noun *wonder* and the adjective *delighted* are being expanded with the use of *THAT*-clauses. The effect of the choice of clauses, instead of phrases, is that it gives the editorial writer the opportunity to pack as much information as possible (Wiredu, 2012, p. 117).

We note that a wide range of nouns, verbs and adjectives typically admit *THAT*-clause complements after them. Wiredu (2012, p. 110) categorizes nouns capable of taking *THAT*-complements into the following three sub-types:

15. Cognitive nouns: nouns which portray the mental frame of the writer. Examples from the corpus include: **hope, belief, reflection, reminder, faith**, etc.
    a. …**the Government is actively conniving at the creation of such a superstate, in the belief that it is the only way to save Europe's economy... <clause text="DT17" snumber="09" cnumber="07" function="nominal complement">**

16. Emotive nouns: nouns which express emotion. Attested nouns include **doubt, feeling, possibility, surprise, etc**.
    a. We have no doubt that Okada served a section of the travelling public…<clause text="DG20" snumber="19" cnumber="39" function="nominal complement">

17. Descriptive nouns: attestations of these nouns which give general descriptions about a situation include **hypocrisy, proof, report, suggestion, ground, etc**.
    a. This opinion is what translated into the suggestion that the CPP should not overburden itself with a shot at the

presidency…<clause text="GT14" snumber="08" cnumber="08" function="nominal complement">

Apart from noun complementation, many of the *THAT*-clauses in the corpus complement certain types of verbs. Our observation is that, the British newspapers exhibited more depth and variety in the verbs used in this manner. The Ghanaian newspapers, on the contrary, were limited in the scope of verbs complemented, though some of the few used were repeated many times. A frequency distribution of type of verbs, which were used with *THAT*-nominal complement in the editorials across the four newspapers, is presented in Table 6 below.

Table 6: Distribution of verbs with *THAT*-complementation across the four newspapers

Newspaper	Frequency	Percentage (%)
DG	54	25
GT	38	18
DT	60	28
TT	62	29
TOTAL	**214**	**100**

Though Table 6 does not capture the number of times individual verbs were used with a complement clause, it at least shows that both of the British newspapers had more types of verbs with nominal complementation. In the next four tables, we present a full list of verbs used with *THAT*-clause complements across the four newspapers, beginning with the *Daily Graphic* in Table 7 below.

Table 7: Verbs used with *THAT*-nominal complements in DG

acknowledge	advise	announce	argue	ascertain
assure	believe	bet	communicate	contest
demand	demonstrate	emphasize	encourage	enjoin
ensure	expect	explain	feel	forget
hear	hold	hope	imagine	imply
indicate	pray	insist	know	maintain
mean	learn	plead	point	point out
presume	realize	recall	recognize	record
reiterate	remember	remind	represent	say
see	show	signal	state	suggest
tell	think		wish	wonder

Table 7 presents the 54 verbs that were used with *THAT*-nominal complements in the *Daily Graphic*. Not only is the *Daily Graphic* among the newspapers with the least attestation of these types of transitive verbs. One equally observes from the corpus that just a few of these verbs were used repetitively with *THAT*-complements; a phenomenon that was at the expense of variety. For instance, the verb **believe** alone was used with *THAT*-clause 37 times, the highest attestation across the four newspapers, followed by the verbs **say** and **ensure** which were used 20 times each. This lack of diversity is not unique to the *Daily Graphic*, for *The Ghanaian Times*, which realized the lowest frequency of *THAT*-nominal complementation, was also characterized by frequent repetition of a few verbs listed in Table 8 below. Thus, the trend that is emerging is that the Ghanaian newspapers are relatively more restrictive in the types of verbs complemented by *THAT*-clause. The most preferred verbs for clause complementation in GT, for example, were **ensure, say** and **believe** with usage attestations of 20:13:12, respectively.

Table 8: Verbs with THAT-nominal complement in GT

acknowledge	admit	advise	argue	assure
believe	caution	complain	confirm	deceive
demonstrate	emphasize	assure	explain	feel
hear	hope	indicate	inform	insist
mean	note	observe	pretend	promise
prove	reiterate	remind	reveal	say
serve notice	show	state	submit	suggest
think	warn	wish		

The monotony in the choice of verbs perhaps contributed to the observation made by Wiredu that Ghanaian editorials do not inspire much reading enthusiasm (Wiredu, 2012).

The British editorials, conversely, used relatively fewer verb tokens and several types. For example, apart from the verb ***say*** which was used 20 times in *The Daily Telegraph,* all other verbs used with clause complementation in DT were used less than 10 times. As a result, the DT has a wide range of verbs complemented by *THAT*-clause. These are instances dialectal variation across registers from different geographical regions. It is perhaps an indication that the writers are writing from variable sociocultural backgrounds. That is, whereas the writer of the British editorials is a native speaker of the language and thus may have versatility in the use of his/her language, the Ghanaian writer is a non-native speaker whose use of the second language may be constrained not only by competence in the language but also by cultural factors. This points towards the fact that though the major clause-types (nominal, relative and adverbial clauses) are similarly distributed across the four

newspapers, variation exists between Ghanaian and British editorials in the detail of the linguistic context of use of these clauses. Verbs used with *THAT*-nominal compliments in DT are presented in Table 9 below.

Table 9: Verbs with *THAT*-nominal complement in DT

acknowledge	accept	add	admit	agree
announce	argue	ask	assume	attempt
avoid	believe	beware	brief	complain
concede	conclude	confirm	consider	convince
decide	demonstrate	deny	determine	doubt
ensure	explain	fear	feel	find
fear	hope	indicate	imagine	insist
know	maintain	mean	misunderstand	pretend
promise	purpose	realize	reassure	recognize
report	rethink	reveal	say	see
show	signal	stress	suggest	tell
think	understand	warn	work out	worry

Perhaps, this is one of the areas where a claim for dialectal or idiolectal variation may be made; for, *The Times*, like its British counterpart (*The Daily Telegraph*), also exhibits diversity in the types of verb complemented by nominal clause. It also has a long list of transitive verbs (in Table 8 below) which are complemented by *THAT*-clauses.

Table 10: Verbs with *THAT*-nominal complement in TT

accept	announce	argue	ask	agree
attempt	believe	complain	concede	conclude
consider	convince	decide	declare	demonstrate
discern	ensure	entail	establish	escape
estimate	expect	explain	feel	find
follow	hint	hope	imagine	insist
know	mean	note	object	persuade
point out	pretend	proclaim	promise	prove
recall	recognize	record	remember	remind
report	reveal	risk	rule	satisfy
say	seek	show	suggest	swear

symbolize	teach	tell	think	understand
warn	wonder			

These dynamics about the distribution of transitive verbs capable of taking *THAT*-complements in the British editorials obviously show divergence with patterns attested in the Ghanaian editorials. For example, it is observed that the following transitive verbs attested with *THAT*-clause complementation in the British editorials are absent from the Ghanaian editorials: **accept, add, agree, ask, assume, attempt, avoid, announce, brief, concede, convince, decode, demonstrate, deny, determine, doubt, find,** etc.

Wiredu (2012, p. 110) again categorizes the types of transitive verbs capable of taking *THAT*-complements into the following two subtypes:

18. Assertion and communication-related verbs: **say, tell, warn, teach, report, point out, object, etc**. There are observably more of these verbs in the British editorials than in the Ghanaian counterparts:
    a. **It has to be *said* that there is nothing resembling a White House operation in 10 Downing Street. <clause text="TT12" snumber="26" cnumber="25">**
19. Verbs of cognition: **think, rethink, believe, hope, hear, understand, know, etc**. These verbs seem generally preferable in the editorial register for there are many verbs from this category across Ghanaian and British newspapers:
    a. **…the Daily Graphic *believes* that national and constituency officers of NDC will take steps to resolve whatever differences… <clause text="DG03" snumber="07" cnumber="09">.**

From this classification, an important differential pattern is emerging between the Ghanaian and the British editorials. One observes that, whereas the British editorialists exploit verbs across the continuum for elaboration, the Ghanaian editorialists limit their choices to verbs of cognition. And this accounts for the absence of the verbs listed above (**accept, add, agree, ask, assume, attempt, avoid, announce, brief, concede, convince, decode, demonstrate, deny, determine, doubt, find,** etc.) from the Ghanaian editorials. This variation has at least two implications.

It is perhaps another indicator, apart from the one mentioned earlier, that though the texts are all newspaper editorials, the addressers are of essentially different sociolinguistic backgrounds and that the variation detected here is a reflection of

variable competencies and linguistic dexterity between a native speaker and a non-native speaker. However, that these essential linguistic features are distributed similarly across the two sociocultural contexts confirms that language is being used generally to perform the same function.

The second implication is that the cognitive verbs preferable across newspapers from the two contexts are typically epistemic. It is normal to assume that the argumentative nature of newspaper editorials would elicit the general predominance of these types of verbs. However, attestations of these verb-types across newspaper-types raise other issues. The preference for the cognitive epistemic verbs in the *Daily Graphic* and *The Ghanaian Times* at the expense of the assertion and communication-related verbs inclines the Ghanaian editorials towards the supplicatory, less forceful end of the continuum. By placing the clause after these epistemic verbs, the Ghanaian editorialist does not make any commitment to the proposition expressed because he or she is only hoping or believing.

These differential patterns of distribution involving nominal complements across British and Ghanaian editorials are perhaps a reflection of how tenor affects language use within different sociocultural contexts. Perhaps, this also reflects the sensitivity in using language in Ghana. That is, the fear of offending people's sensibilities predisposes the Ghanaian editorialist to epistemic expressions including verbal complementation patterns.

Finally, *THAT*-nominal clauses are observed to similarly complement some adjectives, though their attestation in the corpus is minimal. We identified the adjectives reported in Table 11 in complementation with *THAT*-clauses in the corpus.

Table 11: Adjectives with *THAT*-complement clause across the four newspapers

DG	GT	DT	TT
amazing	appropriate	aware	advisable
appropriate	certain	angry	aware
aware	clear	clear	confident
delighted	heart-warming	concerned	inconvenient
happy	gratifying	confident	inexorable
so high	so ingenious	depressing	likely
hopeful	mindful	so disillusioned	obvious
important	obvious	evident	odd
necessary	positive	fortunate	possible
optimistic	proud	so ingrained	reasonable
refreshing	refreshing	important	reassured
regrettable	so sensitive	instructive	right

surprising	sure	right	striking
unfortunate	surprised	so short	sure
	worried	surprising	surprising
		selling	sure
		unsurprising	unaware
		welcome	unlikely
			vital

Table 12 captures these distributional patterns in percentage terms. Here too, as in the verbal complements, the British editorials exhibit variety in choice of words complemented, perhaps for the same reasons argued above for verbal complementation.

Table 12: Distribution of adjectives with *THAT*-clause complementation

Newspaper	Frequency	Percentage
DG	14	21.2
GT	15	22.7
DT	18	27.3
TT	19	28.8
TOTAL	**66**	**100**

We have cited below in sentence 20 an example of structures involving adjectives complemented by *THAT*-nominal clause (the complement clauses have been italicized):

20. It is, therefore, advisable *that it contains experts who have gained their place through their eminence*. <clause text="TT20" snumber="15" cnumber="26">

It must be noted that the adjective post-modified by *THAT*-nominal clauses in sentences (20) is capable of taking an infinitival non-finite clause. And this is not limited to adjectives. In fact, apart from *THAT*-nominal clause-types, *INFINITIVAL* clauses are the most preferred structural patterns of the nominal clause-type with frequency attestations of 30%, 31%, 35% and 37% for DG, GT, DT and TT, respectively (c.f. Table 4 above).

For instance, in sentences (21) and (22), the *INFINITIVAL* clauses …**to protect our infant democracy**…and …**to accept the possibility of this nation going through a similar experience**…complement the noun **duty** in (21) and the adjective **crucial** in (22).

21. *INFINITIVAL*-clause as complement of a noun phrase:
    Indeed, each and every Ghanaian has the greatest *duty* to protect our infant democracy… <clause text="GT01" snumber="05" cnumber="10">
22. *INFINITIVAL*-clause as complement of an adjectival phrase:
    It is crucial for us to accept the possibility of this nation going through a similar experience… <clause text="GT01" snumber="12" cnumber="27">

6. The Relative Clause

The relative clause is the second most attested clause pattern in the corpus with frequency attestations of 32%, 33%, 30% and 30% for DG, GT, DT and TT, respectively (c.f. Table 2 above). These results are noteworthy for at least one reason. The near-identical numerical values across the four newspapers are an indication that some motivation other than house style or dialectal orientation influences their grammatical choices in editorial writing. We note that relative clauses used in the editorial corpus are those which have the following features:

23. *Wh*-Relative clauses: Those which are introduced by a *Wh*-interrogative word (such as **who, whom, whose, which** and sometimes **where, why** and **when** (Greenbaum, 1996). Example:
    This picking of winners is the job not of ministers but of the expert Technology Strategy Board, which Mr Willetts announced yesterday would be setting up a new innovation centre in the area

of satellite applications. <clause text="TT01" snumber="16" cnumber="15">

24. *Whiz*-Relative clause: Those which have a *Wh*-interrogator alone deleted or both a *Wh*-interrogator and a form of the '*be'* verb deleted together. These are either non-finite participial clauses as in sentence (a), or a finite clause with a zero relativizer as in sentence (b) below:
    a. **By contrast, the preparations for this year's Budget seem to have been …an exercise in Coalition horse-trading brokered by the so-called Quad of David Cameron, George Osborne, Nick Clegg and Danny Alexander. <clause text="DT09" snumber="04" cnumber="06">**

    b. **To take on the major charities is to begin a battle the Government cannot and should not win. <clause text="TT12" snumber="14" cnumber="15">**
25. *That*-Relative: Those which are introduced by a *THAT*-complementizer as in (c) below:
    c. **…it is only vigilance and the prevention of the snatching of the ballot boxes that ensure the will of the people is upheld in an election. <clause text="DG02" snumber="14" cnumber="15">**
26. Pied piping Relative: Those (typically *Wh*-relative clauses) which are fronted by a preposition. Example:
    d. **…because there is no reason why many of the existing school buildings should be in such poor state, considering the fact that a huge chunk of the national budget is allotted to the education sector, out of which adequate provision is made for infrastructural development. <clause text="GT11" snumber="12" cnumber="18">**

These four relative sub-types are used in the corpus in the following frequency patterns:

Table 13: Distribution of relative clause patterns

	DG (%)		GT (%)		DT (%)		TT (%)	
Wh-R	107	(29.88)	116	(49.57)	84	(26.16)	97	(25.19)
Whiz-R	142	(39.66)	84	(35.89)	128	(39.87)	108	(28.05)
That-R	85	(23.74)	22	(9.56)	92	(28.66)	142	(36.88)
Pied Piping	24	(6.85)	12	(5.21)	17	(5.36)	38	(9.87)
	358	**(100)**	**234**	**(100)**	**321**	**(100)**	**385**	**(100)**

($\chi 2$ = 32, p-value < 0.01)

Table 13 attests to varied distributional patterns. So far, the relative clause subtypes are the only clause patterns whose usage frequency depends on the type of newspaper. The Chi square result ($\chi 2$ = 32, p-value > 0.01) for the distribution of relative clause subtypes across the four newspapers shows that variations in usage frequencies across the newspaper types are statistically significant. That is, whereas *Whiz* relatives are the most preferred patterns for DG and DT at 40% and 40%, respectively – a pattern similar to Wiredu's (2012) observation, *Wh*-relatives are the most preferred in GT at 50% and *That*-relatives the most preferred in TT at 37%. The only subtype that shows some consistency across the four newspapers is the Pied Piping subtype. These inconsistencies are much pronounced when captured in the graph below.

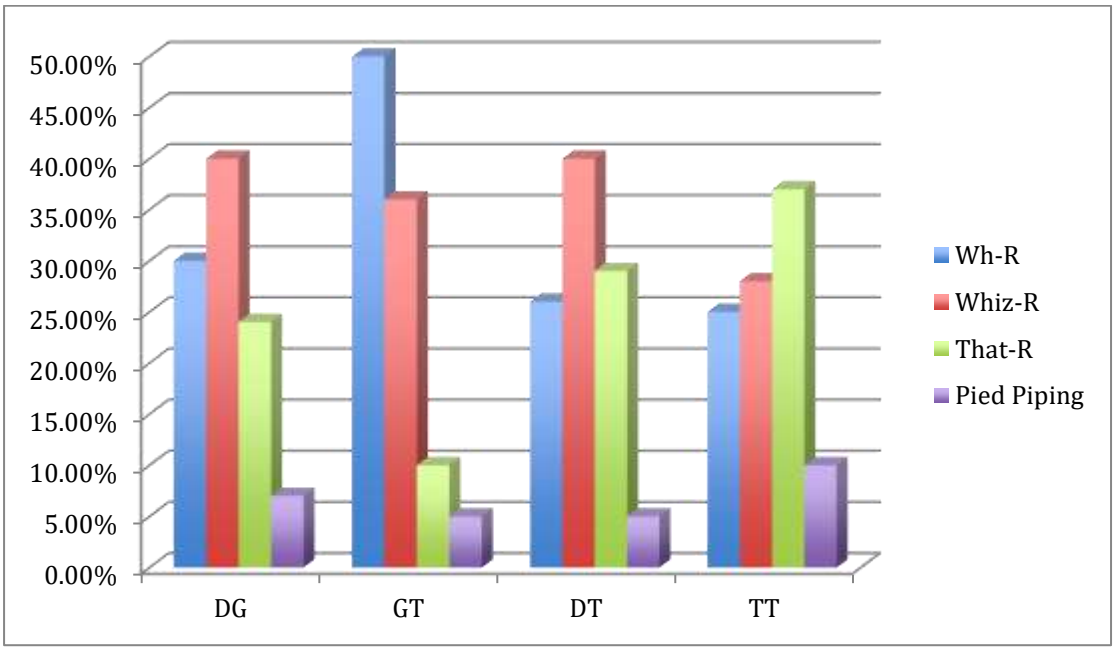

Fig 3: A graphic representation of Relative subtypes

These irregularities captured in figure 3 above do not help for much generalization. That the relative clause exhibits these patterns of distribution is not surprising since relative clauses normally have variable regional usage standards (Hundt, Denison, & Schneider, 2012). Hundt et al. (2012), in fact, observe at least 2 regional norms

- Across British and American English:

  "Matters are further complicated by the fact that there is not a single prescriptive tradition that unifies 'approved' usage on both sides of the Atlantic: the British tradition targets non-restrictive *that*, whereas American arbiters of 'proper' English fight a war against the use of restrictive *which*" (Hundt, Denison, & Schneider, 2012, p. 211).
- Across British and New Zealand English:

  "…in BrE and NZE, 'the two relativizers *which* and *that* may be differentiated in terms of formality . . . rather than restrictiveness', thus confirming regional differences in the effect that prescriptive traditions may have had" (Hundt, Denison, & Schneider, 2012, p. 212).

Nevertheless, the distribution of the relative clause in our editorial corpus does not suggest regional norms may have had any influence in the sense that there are no regional similarities in the patterns of distribution. The only thing one can claim at this stage of the discussion is that all the relative clause subtypes are represented – perhaps indicating they are of some relevance to the editorial register.

The implication is that, whereas relative clauses, such as the underlined in sentence (27), are dominant in GT, the types such as the italicised in sentence (28) are the most attested in DG, DT and TT.

27. **…The exercise enters its fifth day today, but there are reports of certain problems *which…may affect its eventual success*. <clause text="GT08" snumber="03" cnumber="05">**
28. **Power is a function of those *who wield it*. <clause text="TT05" snumber="10" cnumber="18">**

Moreover, the consistent similarity in the attestation of Pied Piping structures contributes to the nature of newspaper editorial language. Pied piped structures "tend to occur more frequently in formal styles" (Greenbaum, 1996, p. 226). Their minimal usage across the four editorials perhaps indicates that newspaper editorials are not at the most formal end of the formality continuum among written varieties.

A closer look at the individual subtypes of the relative clause presents very insightful revelations. We observe, for example, that *who* and *which* are the dominant relativizers for the realization of *Wh*-Relative clauses across the four newspapers. As captured in Table 14 below, whereas *who* is the dominant relativizer in the British editorials (49% each in DT and TT) the dominant relativizer in the Ghanaian editorials is between *who* (63% for DG) and *which* (58% for GT).

Table 14: Distribution of relativizers

	DG (%)		GT (%)		DT (%)		TT (%)	
Who	65	(62.5)	41	(35.96)	40	(48.78)	47	(49.47)
Whom	0	(0)	1	(0.87)	0	(0)	0	(0)
Whose	5	(4.80)	6	(5.26)	11	(13.41)	7	(7.36)
Which	34	(32.69)	66	(57.89)	31	(37.80)	41	(43.15)

	104	**(100)**	**114**	**(100)**	**82**	**(100)**	**95**	**(100)**

Besides, even though the relative pronouns attested in the editorials perform subjective, objective and possessive functions, they are more attested in subjective positions throughout the four newspapers. A survey of their usage in subject and object positions reveals the results presented in Table 15 below:

Table 15: Distribution of relative pronouns in subject and object positions

	DG (%)		**GT (%)**		**DT (%)**		**TT (%)**	
Subject	86	(88.65)	88	(91.66)	64	(92.75)	69	(87.34)
Object	11	(11.34)	8	(8.33)	5	(7.69)	10	(12.65)
	97	**(100)**	**96**	**(100)**	**69**	**(100)**	**79**	**(100)**

By implication, the dominant *Wh*-relative clauses in the corpus are the ones in which the noun phrase specified in the relative clause is the subject of the relative clause (Wardhaugh, 1995). For example, in sentence (29), the head of the NP *Mr Kagame* is the subject of the underlined relative clause in the sense that it is *Mr Kagame* 'who became President'.

29. Its military commander was Mr Kagame, *who became President in 2000*. <clause text="TT34" snumber="13" cnumber="04">

Relative clauses such as the one in sentence (29) above are the ones whose relativizers are inalienable. On the contrary, relative clauses such as the one in sentence (30) below can have their *Wh*- relative pronouns deleted. In these relative clause-types which are the least frequent in the corpus, the NP substituted for is the object of the relative clause.

30. …there is something beautiful in unity *which we have missed all these years*. <clause text="DG22" snumber="13" cnumber="24">

Whiz-relative subtypes manifest in three different forms in the corpus. There are those in which only the *Wh*- element is elided (*Wh*-Deleted relatives) as the italicised in sentence (31) below; and there are those which have both the *Wh*-relativizer as well as an aspect of the *be* verb deleted (as described above). Of this second category, we identify two subtypes in the corpus: those whose verbs are in the present participial forms (reduced *–ing* relatives underlined in sentence (31) below) and those whose verbs are in the perfect participial form (reduced *–en* relatives underlined in sentence (33) below).

31. **Perhaps, if Mr Huhne is found to be not guilty of a charge *he intends to dispute vigorously*, he will be free to resume his political career. <clause text="TT04" snumber="11" cnumber="14">**
32. **These interventions will inevitably be couched in terms of ministers vs backbenchers, of a restive party testing its leader's mettle. <clause text="DT04" snumber="08" cnumber="17">**
33. **We must seek to build on the successes *chalked up in the previous elections*. <clause text="DG02" snumber="17" cnumber="19">**

These three subtypes of the *Whiz*- relative clause are distributed in the corpus as presented in Table 16 below:

Table 16: Distribution of Whiz-Relative subtypes

	DG (%)		GT (%)		DT (%)		TT (%)	
***Wh*-Del**	33	(23.23)	23	(27.38)	32	(25)	32	(29.62)
Reduced –ing	51	(35.91)	29	(34.52)	42	(32.81)	31	(28.70)
Reduced –en	58	(40.84)	32	(38.09)	54	(42.18)	45	(41.66)
	142	**(100)**	**84**	**(100)**	**128**	**(100)**	**108**	**(100)**

Obviously, the reduced –en *Whiz*-relative clause is the preferred choice across the four newspapers, followed by the reduced *–ing* subtype or the *Wh*-deleted structure depending on the type of newspaper. These patterns of distribution show that

the perfect participial relative structure is of some functional significance in the newspaper editorial, in the light of the register theory. If newspaper editorials are meant to comment on past events as adduced in the literature (Wiredu, 2012), then it makes sense that the perfect participial, which shows some connection with the past, is preferred.

Unlike *Wh*- and *Whiz* relative clause types, *That*-relative clauses attested in the corpus are more straightforward in the sense that there are no subtypes. A typical example of *That*-relative clause is the one italicised in sentence (34) below.

34. **The expensive mistakes *that governments in the 1970s made* while attempting to pick corporate winners.... <clause text="TT01" snumber="06" cnumber="04">**

That-relatives are distinguishable from *That*-nominal complements in the sense that they have their unique intonational property and internal grammar. For instance, *that* in *That*-relatives is replaceable by *which or who*. And so, though it is possible to replace the *that* in the relative clause in sentence (34) above with *which* as in (35) below,

35. **The expensive mistakes *which* governments in the 1970s made…**

It is not possible to do the same with the *That*-complementizer in the nominal complement in sentence (36) below.

36. **There is also an argument *that the devolution of decision making in the NHS did not require a structural overhaul...* <clause text="DT05" snumber="08" cnumber="12">**

The discussion on the distribution of relative clause structures in the editorials will be concluded by two general observations. In the first place, the relative clause is the only clause-type whose sub-types are distributed relative to newspaper type. That is, apart from the Pied Piping type, which is the least preferred type across the four newspapers, all the other subtypes are irregularly distributed across the four newspapers. A comparative schema representing the use of the relative clause system in the editorial will appear as follows:

- The *Whiz*-relative is the most preferred type in DG (39.66%), followed by the *Wh*-relative (29.88%). *That*-relatives are equally significantly represented (23.74%) in DG;

- The *Wh*-relative is the most preferred pattern in GT (49.57%), followed by the *Whiz*-relative (35.89%). The *That*-relative is minimally represented in GT (9.56%);
- The *Whiz*-relative is the most preferred type in DT (39.87%), followed by the *That*-relative (28.66%). *Wh*-relative subtypes are equally significantly attested in DT (26.16%);
- The *That*-relative is the most attested type in TT (36.88%), followed by the *Whiz*-relative (28.05%). The *Wh*-relative is equally significantly represented in TT (25.19%).

These variations in distribution are confirmed by the statistical test ($\chi 2$ = 32, p-value > 0.01). This means, in the first place, that relative clause subtypes do not share similar patterns of distribution even across newspapers from the same sociocultural context. As a result of these inconsistencies, it is difficult ascribing function to the individual subtypes of the relative clause. What can be argued, however, is that the relative clause in general is functional in the editorial register in the sense that it is the second most attested clause pattern consistently across the four newspapers.

Relative clauses generally perform elaborative functions, as argued above; they provide specificatory elaboration (Wiredu, 2014) to the noun phrase they post-modify. The implication is that information elaboration is crucial to the newspaper editorial register and so the two most preferred clause patterns in the corpus are the nominal clause and the relative clause which both perform this function. This same function, we argue, is perhaps what has conditioned the nominal clause patterns and the relatives to be prominently used in rank shifted positions.

7. The Adverbial Clause

Adverbial clauses are non-rank shifted hypotactic clauses (Halliday & Matthiessen, 2004). That is, they do not grammatically depend on a phrase; they depend rather on a main clause to provide circumstantial enhancement about the information expressed in the main clause (Downing & Lock, 2006). Clause circumstantial enhancement is realized in the editorials in the following patterns of instantiation.

Table 17: Distribution of adverbial clause-types

	DG (%)	GT (%)	DT (%)	TT (%)

Time	88	(31.88)	45	(28.12)	70	(27.13)	73	(25)
Condition	47	(17.02)	23	(14.37)	41	(14.34)	46	(15.75)
Reason	36	(13.23)	32	(20)	30	(11.62)	34	(11.64)
Purpose	30	(10.86)	16	(10)	20	(7.75)	9	(3.08)
Concession	21	(7.72)	14	(8.75)	21	(8.13)	21	(7.19)
Manner	15	(5.51)	14	(8.75)	34	(13.17)	45	(15.41)
Result	5	(1.83)	0	(0)	3	(1.16)	6	(2.0)
Place	0	(0)	2	(1.25)	2	(0.77)	5	(1.52)
Others	34	(12.5)	14	(8.75)	37	(14.34)	46	(15.75)
	276	**(100)**	**160**	**(100)**	**258**	**(100)**	**292**	**(100)**

$\chi 2$ = 18. 3, *p*-value =0.6

Observably, the most preferred clause patterns for realising circumstantial enhancement across the four newspapers is the *time adverbial* clause. This is followed, depending on the type of newspaper, by any one of the following types: *conditional, reason, purpose, concession*, and *manner adverbial* clause. We observe further that whereas the *manner adverbial* clause is significantly attested in the two British newspapers, it is among the least realized circumstantial clause in the Ghanaian editorials. It is equally noteworthy that *result* and *place adverbials* are the least preferred types across the four newspapers. However, in spite of the irregularities observed, the statistical test of dependence confirms that the distribution of adverbial clause subtypes in the editorials is independent of newspaper type ($\chi 2$ = 18.3, *p*-value = 0.6). What this means is that the differences in usage patterns are statistically insignificant. In spite of the principle to explore the pervasive dominant linguistic pattern (i.e. time adverbials) (Biber & Conrad, 2009) we equally pay some attention to the following second dominant subtypes whose choices are newspaper-dependent: conditional, reason and manner clauses since they too have interesting usage dynamics.

The primary motivation for the dominance of time adverbials is a functional one. There is the impression that temporal enhancement is relevant to the persuasive

function of newspaper editorials. This observation is emphasized by the fact that the corpus exhibits a wide range of types of *time adverbial* clause, signalled chiefly by subordinators such as *when, while, before, after, since, as, once, by the time* and by some present participial clauses. Details of distribution of time adverbial clause patterns are presented in Table 18.

Table 18: Distribution of time adverbial clause subtypes

	DG (%)		GT (%)		DT (%)		TT (%)	
when(ever)	35	(39.77)	20	(37.03)	33	(46.47)	32	(45.07)
while	15	(17.04)	19	(35.18)	20	(28.16)	11	(15.49)
since	5	(5.68)	1	(1.85)	5	(7.04)	1	(1.40)
before	4	(4.54)	2	(3.70)	0	(0)	7	(9.85)
after	3	(3.40)	1	(1.85)	0	(0)	2	(2.81)
Until/till	2	(2.27)	1	(1.85)	1	(1.40)	0	(0)
as	15	(17.04)	8	(14.81)	1	(1.40)	7	(9.85)
once	1	(1.13)	0	(0)	2	(2.81)	1	(1.40)
now that	0	(0)	1	(1.85)	0	(0)	2	(2.81)
(for) as long as	0	(0)	0	(0)	1	(1.40)	0	(0)
by the time	0	(0)	0	(0)	0	(0)	1	(1.40)
at the time	1	(1.13)	0	(0)	0	(0)	0	(0)
Participial	7	(7.9)	1	(1.85)	8	(11.26)	7	(9.85)
	88	**(100)**	**54**	**(100)**	**71**	**(100)**	**71**	**(100)**

It is obvious, looking at Table 18 above, that the *time adverbial* clause is the dominant type mainly because temporality is realized across a wide spectrum of the time continuum. However, the most attested *time adverbial* clauses are the *when*, *while*, and *as* time adverbials instantiated in sentence (37) – (39) below.

37. **But *when the Chancellor gets to his feet on March 21 to make his Budget statement* he will not be able to announce a cut in taxes…<clause text="TT08" snumber="05" cnumber="01">**
38. ***While saluting the victors of the NDC primaries and commiserating with the losers*, we urge the other political parties…to be guided by internal democratic principles… <clause text="DG03" snumber="18" cnumber="26">**
39. ***As the Conservatives lick their wounds after Thursday's polls, and Labour counts its gains*, the question that will preoccupy all parties is whether the**

outcome represents a fundamental rejection of David Cameron, or a temporary rift. <clause text="DT14" snumber="03" cnumber="01">

It may be argued that these types of *time* adverbials are dominant probably because the enhancement functions relevant for the realization of the communicative purpose of the editorial register are "temporal overlap" with the subordinator *when* and "temporal simultaneity" with the subordinator *while* (Cristofaro, 2003, p. 159). With these functional relations, the times during which events were realized in the editorials are perceived to be either unspecific or fleeting (Cristofaro, 2003).

Apart from *time* adverbials, the other most preferred subtype across three newspapers (DG, DT and TT) is the conditional clause. We observe that the most attested conditional pattern is the *if* type, though there are other minimally attested subtypes: *should*, *had*, *provided* and *unless*.

40. **Such practices, *if they exist,* should not be an incentive for the Government to change the law. <clause text="TT11" snumber="22" cnumber="27">**
41. **It is for this reason that the decision by the government to come up with code of ethics for members of its communications team must be seen as a positive development on the political landscape, *provided the team members will abide by the provisions*… <clause text="DG04" snumber="05" cnumber="11">**
42. **It is crucial for us to accept the possibility of this nation going through a similar experience, *unless we work effectively against such political turmoils*. <clause text="GT01" snumber="12" cnumber="29">**

The *if*-conditional and the other uncommon conditional clause types are represented in the corpus in the distributional patterns captured in Table 19 below.

Table 19: Distribution of conditional clause subtypes

	DG (%)		GT (%)		DT (%)		TT (%)	
If	44	(97.77)	16	(72)	30	(85.71)	45	(86.53)
Unless	0	(0)	5	(22.72)	1	(2.85)	0	(0)
Should	0	(0)	1	(4.54)	0	(0)	5	(9.61)

Had	0	(0)	0	(0)	2	(5.71)	2	(3.84)
Provided	1	(2.22)	0	(0)	1	(2.85)	0	(0)
	45	**(100)**	**22**	**(100)**	**35**	**(100)**	**52**	**(100)**

These conditional structures are the open type of conditionals, rather than the hypothetical types. This pattern corroborates Wiredu's (2012) observation about the distribution of conditional patterns in his data.

Reason adverbial clauses are another common type across the four newspapers. Their detailed attestations, however, seem to be somehow influenced by regional norms. For example, whereas it is the third most preferred type in DG, it is the second most preferred in GT the fourth in the British editorials. One realizes that the dominant *reason adverbial* clauses are the ones with *because* subordinator as underlined in sentence (43), followed by *since* reason adverbials underlined in sentence (44).

43. It is bold *because…Mr Salmond has been free to pursue his own ends at his own speed*</clause>. <clause text="TT02" snumber="09" cnumber="09">

44. *Since we are constantly being told that this is not allowed under the convention*, how have the French managed to do it? <clause text="DT11" snumber="11" cnumber="19">

The usage patterns of reason adverbial clauses across the four newspapers are presented in Table 20.

Table 20: Distribution of reason adverbials

	DG (%)		GT (%)		DT (%)		TT (%)	
Because	19	(50)	11	(39.28)	18	(62.06)	19	(65.51)
Since	3	(7.89)	11	(39.28)	4	(13.79)	1	(3.44)
So that	4	(10.52)	0	(0)	1	(3.44)	0	(0)

For	2	(5.26)	2	(7.14)	2	(6.89)	2	(6.89)
As	6	(15.78)	3	(10.71)	1	(3.44)	3	(10.34)
So	1	(2.63)	0	(0)	0	(0)	0	(0)
So long as	2	(5.26)	0	(0)	0	(0)	0	(0)
For + -ing	1	(2.63)	0	(0)	0	(0)	0	(0)
In that	0	(0)	1	(3.57)	1	(3.44)	0	(0)
Given that/how	0	(0)	0	(0)	2	(6.89)	4	(13.79)
	38	**(100)**	**28**	**(100)**	**29**	**(100)**	**29**	**(100)**

A structural pattern concomitant with *reason* adverbials is observed in the corpus. One observes that Ghanaian editorials have a relatively straightforward argumentative structure, which begins with background information, followed by an introduction of the subject under discussion and a justification for taking a particular position, and ends with an assurance, a solution, or a projection into the future. The reason adverbial clause is observably one of the favoured structures for rendering the justification in the Ghanaian editorials, usually captured explicitly in one of the paragraphs in the middle (body) of the text in any of the patterns below:

- This is the reason why we…
- The Daily Graphic/The Ghanaian Times therefore…
- That is why the Daily Graphic/The Ghanaian Times…
- We therefore, call on the victors…
- This is because….

The British editorials, however, exhibit a more intricate argumentation, which becomes the platform for the adverbial clauses attested in them.

We also note that though *manner* circumstantial clauses are not particularly favoured by the Ghanaian editorials, they are indeed the third most preferred adverbial clauses in the British editorials. Because the *manner* adverbial clause is significantly attested in the British editorials, we present their usage patterns in the British editorials only in Table 21 below.

Table 21: Distribution of manner adverbials across the British newspapers

	DT (%)		TT (%)	
As	27	(65.85)	24	(75)
As if	3	(7.31)	1	(3.12)
As though	1	(2.43)	1	(3.12)
Like	1	(2.43)	0	(0)
In the way	3	(7.31)	0	(0)
Participial	6	(14.63)	6	(18.75)
	41	**(100)**	**32**	**(100)**

We observe from Table 21 that *manner* adverbial clauses such as the one underlined in sentence (45) below are the dominant type in the corpus.

45. **When the going gets tough, *as it has this past week or so*, Mr Cameron needs all the backing he can get from his supporters. <clause text="DT10" snumber="13" cnumber="19">**

8. Convergence and/or Divergence

It is important to offer a summary of divergence and/ or convergence in the distribution of the clause patterns. Based on the distributional behaviour of these categories in the editorials, a general comparative schema may be deduced as follows:

- There are patterns which are consistently similarly attested across the four newspapers. These are what may be referred to as *total consistency*.
- There are patterns which are similarly distributed only across newspapers from the same socio-cultural contexts. These may be referred to as *partial consistency*.
- There are patterns which are unique to individual newspapers. These are referred to as *zero consistency*.

Total consistency is considered to be functional. That is, clause patterns, which are similarly distributed across the four newspapers, are the ones which are deemed to be performing a communicative function in a situational context. In this regard, the patterns of distribution of *nominal* clause, relative clause and adverbial clause (see Table 2) are functional for the similarity in their distribution across the four newspapers, confirmed by the statistical measurement ($\boldsymbol{x^2}$ =0.4, *p*-value = 0.09). This is in line with the claim of the register theory that functional linguistic features are similarly distributed across dialects of the same variety.

The distribution of the *nominal* clause subtypes also exhibit total consistency. The *nominal* complement type is the dominant subtype across the four newspapers followed by verbal complements. This pattern confirms the functionality of the nominal clause in newspaper editorials.

The detailed attestations of *relative* and adverbial clause subtypes, however, instantiate partial consistency and zero consistency. For the *adverbial* subtypes, apart from the *time* clause, which is similarly distributed across all four newspapers, the rest are distributed based on the regional context of production. The statistical test, however, reveals that these variations are negligible.

The distribution of the internal subtypes of relative clauses instantiates zero consistency. Each of the subtypes seems to be influenced by some local house style. The implication may be that the classification of relative clause subtypes adopted in this study is not functionally dependent. Apparently, this model of classification was preferred for ease of identification and for its structure-dependence. One wonders what the traditional classification into restrictive non-restrictive and sentential relative subtypes would present for functional analysis.

9. Conclusion

We have argued in this work that the editorial corpus of this study supports the claim that linguistic features are typically functionally distributed in a particular

register. Our argument has been substantiated by the findings that the primary clause patterns and even some of their subtypes are similarly distributed across editorials from the four newspapers selected from the two sociocultural contexts. We established that nominal and relative clause types are the dominant types because they facilitate the packaging of complex information necessary for persuading readers.

Finally, the study compared patterns of distribution of clause types based on which a schematic pattern was developed. It emerged that there are more convergent patterns of distribution than there are divergent patterns. The overwhelming convergences in the distributional patterns have been used to argue in support of the register theory that linguistic features are functionally distributed in a given register even across regional dialects of a language.

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Under the auspices of the West African Linguistic Society (WALS), the University of Education, Winneba in association with the Linguistics Association of Ghana (LAG) announces that the joint 30th West African Languages Congress (WALC 2017) and 10th Linguistics Association of Ghana (LAG) Conference will be held from 31st July-5th August 2017 at the University of Education, Winneba, Ghana. The conference will focus on all aspects of West African linguistics (descriptive, theoretical and applied) and Literature.

The conference theme is:

THE ROLE OF LANGUAGE IN THE INTEGRATION AND DEVELOPMENT OF WEST AFRICA

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- Linguistic human rights in West Africa
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