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Dialect Diversity in Eve and Its Impact on the Lexical Sets: Nurse, Dress and Letter

Lena Awoonor-Aziaku[δ]

ABSTRACT

This paper investigates how dialectal variation in Eʋe—specifically the Eʋeme and Aŋlɔ varieties—shapes the pronunciation of three English lexical sets: NURSE, DRESS, and lettER. Using a variationist framework, the study analyses vowel quality, duration, and pitch from controlled word-list readings (fifteen items per lexical set) produced by Eʋe-speaking English users in Ghana. Acoustic measurements of the recorded samples were complemented by statistical testing to quantify patterns of variation. Results reveal substantial variability across all three sets, with the lettER set showing the greatest degree of alternation. Tokens in lettER were realised variously as [ɪ], [ʌ], [o], and [ə]; these alternations showed little systematic dialectal conditioning except for the occurrence of [o]. The DRESS set displayed moderate, dialect-linked variation, with three primary realisations—[ɪ], [e̯], and [ɜː]. While Aŋlɔ speakers produced all three variants, Eʋeme speakers favoured [e̯] and [ɜː]. The NURSE exhibited the least variation, chiefly alternating between [e̯ː] and [ɜː], with Eʋeme speakers predominantly using [e̯ː] and Aŋlɔ speakers using both [e̯ː] and [ɜː]. These patterns are interpreted as evidence of emerging local and non-local varieties within Eʋe English: a local accent diverging from Received Pronunciation (RP) and a non-local form approximating RP quality. Instances such as the fronting of NURSE toward /e/ in some speakers versus RP-like [ɜː] in others, and the mixture of RP-like and alternative realisations in DRESS, support this two-variety account. The alternation between full vowels ([ɪ], [o], [ʌ]) and reduced [ə] in lettER further illustrates this split. Phonological characteristics of Eʋe—comparable mid vowels, preference for open syllables, limited vowel reduction, and deletion of post-vocalic /r/—help explain the observed substitutions and near-target realisations with slight raising or centralisation. While dialect geography is a significant predictor of vowel realisation, phonological conditioning and individual speaker idiosyncrasy also contribute. The study underscores the systematic nature of cross-linguistic transfer and the necessity of accounting for dialect background in pronunciation teaching, intelligibility assessment, and research on vowel systems and sound change among Eʋe-speaking learners of English.

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I. BACKGROUND OF THE STUDY

The study of variation, particularly variation in English pronunciation, has long been central to sociolinguistics and sociophonetics. One widely used framework for comparing vowel systems across English varieties is Wells's (1982) lexical-set system. Wells grouped English vowels into lexical sets to provide a consistent basis for analysing pronunciation differences across accents. In Received Pronunciation (RP), the NURSE lexical set is typically realised as [ɜː], whereas in General American (GA), it is commonly realised as [ɝ], with rhotic colouring. Variation in NURSE therefore involves, among other features, rhoticity—the presence or absence of post-vocalic /r/—as well as differences in vowel quality and centralisation. DRESS is typically represented as [e] in RP and [ɛ] in GA (Wells, 1982). Although this distinction may appear relatively subtle, differences in vowel height and quality can serve as important markers of regional identity and accent variation (Trudgill, 1999). The lettER lexical set is typically realised with schwa [ə] in non-rhotic accents and with an r-coloured vowel [ɚ] in rhotic varieties such as GA. Variation in lettER is therefore closely associated with patterns of vowel reduction and rhoticity.

Across English-speaking regions, including the United Kingdom, North America, the Caribbean, Africa and other postcolonial contexts, these lexical sets display systematic variation shaped by historical development, language contact and sociolinguistic factors (Kachru, Kachru, & Nelson, 2006). In second-language settings in particular, speakers' existing phonological systems may influence how English vowels are produced. Where a target vowel has no close equivalent in a speaker's first-language phonological system, a phonetically or phonologically similar vowel may be used instead.

Dialect diversity is a natural feature of living languages and reflects a complex interplay of historical migration, geography, social interaction and language contact. Eʋe provides a particularly useful case for examining such diversity within a multilingual linguistic ecology. In West Africa, where multilingualism, migration and language contact are widespread and language plays an important role in cultural identity, dialect variation may carry both linguistic and social significance (Chambers & Trudgill, 1998).

Eʋe, or Eʋegbe, pronounced [èβègbè], belongs to the Gbe group of the Niger-Congo language family and is spoken primarily in southeastern Ghana and southern Togo, with related varieties extending into Benin and neighbouring areas (Greenberg, 1963). Estimates cited by Gavua (2000) place the number of Eʋe speakers at approximately three million. Eʋe is not monolithic; rather, it constitutes a dialect continuum in which varieties spoken in neighbouring communities may exhibit noticeable differences (Atakpa, 1997). Despite this variation, substantial mutual intelligibility exists across the continuum. Eʋe varieties have been classified in different ways, but geographical distinctions are commonly made between coastal and inland varieties (Ansre, 1961; Westermann, 1930).

Dialectal differences occur at several linguistic levels, including phonology, lexis, morphology and tone. Phonetic differences may be subtle but systematic, with particular consonants and vowels realised differently across communities. Lexical variation likewise occurs in words used for common concepts, reflecting the effects of geographical separation and local histories. Such variation is not merely structural; speakers may recognise and use dialect features as markers of regional identity, social affiliation and group membership (Awoonor-Aziaku, 2015).

The development of Standard Eʋe in the early twentieth century also influenced dialect use and language attitudes. Missionary linguistic work and colonial education contributed to the development and dissemination of orthographic and educational materials based on particular regional forms. Standardisation facilitated literacy, religious instruction and formal communication in Eʋe, but it also contributed to the association of some forms with greater prestige or normativity than others.

Dialect diversity continues to influence language use across social domains (Awoonor-Aziaku, 2015). In local contexts such as households, community gatherings and marketplaces, speakers may favour their home varieties, thereby maintaining phonological and lexical features associated with local identity. In broader communicative settings involving speakers from different Eʋe-speaking areas, speakers may adopt more widely intelligible or standardised forms. Such accommodation reflects speakers' ability to negotiate dialect differences according to communicative context.

Language contact and multilingualism provide an additional dimension (Kachru et al., 2006; Schneider, 2007). Eʋe speakers frequently interact with speakers of other Ghanaian languages, including Akan and Ga, as well as with speakers of languages in neighbouring countries. Such contact creates conditions for bilingualism, multilingualism, code-switching and borrowing. The use of English in Ghana and French in Togo further shapes the linguistic repertoires of Eʋe speakers (Awoonor-Aziaku, 2015). English and French are prominent in formal education, administration and the media, whereas Eʋe remains important in community communication, broadcasting, literacy programmes and cultural activities. These multilingual environments provide opportunities for contact-induced linguistic influence and mixed-language practices.

Dialect diversity also intersects with language attitudes and prestige. Some dialect forms may be perceived as more standard or socially desirable because of historical associations with education, economic opportunity or cultural influence. Speakers may consequently modify strongly localised features in formal or cross-regional interactions. Dialect variation may therefore interact with social mobility, identity and communicative strategy. Such processes may also influence language maintenance and change across generations.

Modern communication technologies have further expanded opportunities for dialect contact. Radio, television and digital media circulate particular Eʋe forms beyond their traditional geographical areas, while online communication can simultaneously provide spaces for the representation and maintenance of local forms. Contemporary patterns of mobility and media exposure may therefore both reduce and reinforce dialect differentiation.

Social and attitudinal factors may also influence how dialect diversity relates to English pronunciation. Speakers' attitudes towards their own dialects, perceptions of prestige associated with particular Eʋe or English varieties, and patterns of exposure to English may contribute to differences in pronunciation. Speakers with extensive exposure to English through education, mobility and media may have access to a wider range of English pronunciation models, whereas speakers whose linguistic networks are more locally concentrated may retain stronger features associated with their Eʋe phonological backgrounds. These possibilities require empirical investigation rather than being assumed in advance.

Against this background, the present study examines the pronunciation of the NURSE, DRESS and lettER lexical sets among speakers of two Eʋe dialect groups, Eʋeme and Aŋlɔ. The phonological systems of these dialects provide potentially different phonetic resources through which speakers may map English vowels. The study therefore investigates whether systematic differences in English vowel production are associated with dialect background, while recognising that phonological context, individual variation and broader sociolinguistic experience may also contribute to the observed patterns.

II. AN OVERVIEW OF EVE

The term Eʋe refers both to a people and to their language. The language, also known as Eʋegbe and pronounced [èβègbè], is spoken across a geographical area extending from Ghana through Togo and Benin to the Badagry area of Nigeria. Eʋe belongs to the Gbe group within the Niger-Congo language family (Greenberg, 1963; Westermann, 1930). In the literature, the wider language cluster has been referred to by several names, including Adja, Aja, Adja-Tado, Fon-Eʋe, Eʋe-Fon, Adja-Eʋe and Eʋe-Adja (Bertho, 1946; Dakubu, 1977; de Medeiros, 1984). Capo (1991) discusses the adoption of Gbe as a broader designation for the cluster, although Eʋe remains widely used, particularly in Ghana.

The wider Gbe cluster has been classified in different ways by various scholars. Ellis (1890), for

example, distinguished five dialect groupings: Mahi; Dahomi or Effon; Anfueh; Awuna or Aŋlɔ; and Whydah or Weta. Westermann (1930), by contrast, proposed three broad geographical divisions: a western group extending northwards towards Atakpame; a central group, including Gɛ̃or Anexɔ, spoken around Lomé and Grand Popo; and an eastern group, including Fɔgbe, extending from Grand Popo towards Badagry. Ansre (1961) similarly recognised broad western, central and eastern divisions, although the composition of the groups differs in some respects from Westermann's classification.

Pazzi (1979) likewise recognised extensive dialect diversity within the Gbe-speaking area. His classification identified four older varieties—Vhe, Aja, Ayizɔ and Xwla—which he associated with Tado, together with Fɔn and Gun and the additional varieties Gɛn, Sahwe and Xweɖa. Although Pazzi treated these nine divisions as conventional classifications rather than sharply bounded linguistic systems, he emphasised the continuum of related varieties and the substantial mutual intelligibility between neighbouring groups.

Pazzi's Vhe grouping broadly corresponds to the western part of the dialect continuum and includes several communities represented in Ghana. These include Tɔŋu, Be, Aŋlɔ, Anfɔe, Peki, Kpando, Fodome, Ho, Vo, Avenɔ, Avedakpa, Dayin, Agu, Waci and Mafi, among others. The name Vhe itself displays dialectal phonetic variation. It may be realised as [əʊə] among some Waci and Aŋlɔ speakers, [ɛʊɛ] among Peki speakers, [èʊè] among Kpando speakers and [èvè] among some Fon and Aja speakers. These differences illustrate the phonetic diversity that characterises the broader dialect continuum.

Capo (1991) proposed a five-way classification of the Gbe cluster that includes Gɛn, Aja, Fɔn, Phla-Pherá and Vhe. Of particular relevance to the present study is the Vhe grouping, within which Capo identifies several phonological innovations. These include developments involving the consonants /ʃ/ and /ʊ/ and variation in the realisation of front mid vowels. Consequently, cognate forms may differ systematically across sub-dialects. For example, the expression represented as [ɛdĩm] in Peki may be realised as [edĩm] in Kpando and [ədĩm] in Aŋlɔ and Tɔŋu. Additional examples are presented in Appendix 1.

Capo (1991) also describes historical developments affecting labial-velar and labialised consonants, as well as the development of earlier aspirated alveolar stops into /t/ and /d/. Such patterns demonstrate that considerable dialectal variation exists even within the Vhe grouping, affecting pronunciation, vocabulary and tone. At the same time, substantial structural overlap and mutual intelligibility are maintained across the varieties.

For the purposes of the present study, the Eʊe varieties spoken in Ghana may be grouped geographically into three broad sub-dialect areas: Aŋlɔ-Eʊe, Tɔŋu-Eʊe and Eʊeme-Eʊe. Aŋlɔ-Eʊe is spoken mainly in coastal areas of the Volta Region, including Aŋlɔga, Keta, Woe, Kedzi, Anyako and Dzita. Tɔŋu-Eʊe is associated with the central part of the Eʊe-speaking area in Ghana, including communities such as Mafi, Battor, Mefe, Agave, Bakpa and Volo. Eʊeme-Eʊe is spoken mainly in the northern part of the Eʊe-speaking area, including Hohoe, Kpando, Peki, Ho, Kpedze, Vakpo, Alavanyo, Logba, Lolobi and neighbouring communities (Atakpa, 1997; Gavua, 2000).

These geographical categories should not be understood as internally homogeneous. Considerable variation exists within each grouping, and boundaries between neighbouring varieties may be gradual rather than categorical. Nevertheless, this broad division provides a useful framework for examining whether dialect background is associated with systematic differences in English pronunciation. The present study focuses specifically on Aŋlɔ-Eʊe and Eʊeme-Eʊe speakers and investigates how the dialect backgrounds relate to the production of the English NURSE, DRESS and lettER lexical sets.

III. PROBLEM STATEMENT

English in Ghana exists within a multilingual environment in which it functions as the official language and as a major medium of education, governance and wider communication. Nevertheless, much of the literature on Ghanaian English has tended to treat the variety as relatively homogeneous, with limited attention to internal ethnic, dialectal and sociophonetic differentiation. Among Eʊe speakers, for example, noticeable variation occurs in the production of certain English vowels (Awoonor-Aziaku, 2018). Such variation may

involve substitution, merger, centralisation or other phonetic adjustments and may be associated with both linguistic and social factors.

Despite the growing body of research on Ghanaian English, relatively little attention has been given specifically to the extent to which dialect diversity within Eʋe is associated with the realisation of the NURSE, DRESS and lettER lexical sets. This leaves an important gap in our understanding of the distribution and sociophonetic conditioning of English vowel variation among Eʋe speakers.

A clearer empirical account of these patterns is important for several reasons. It contributes to the phonological description of Ghanaian English, provides evidence relevant to intelligibility in formal and wider communicative contexts, and may inform English pronunciation teaching and assessment. It also contributes to broader discussions of internal variation in World Englishes and the development of localised pronunciation norms.

The present study therefore investigates how speakers from two Eʋe dialect groups realise the NURSE, DRESS and lettER lexical sets and examines the extent to which the observed patterns are associated with dialect background, phonological conditioning and individual speaker variation. In doing so, the study contributes to a more internally differentiated account of Ghanaian English and to research on language contact, phonological adaptation and sociophonetic variation.

IV. OBJECTIVES OF THE STUDY

The study examines how dialect diversity in Eʋe is associated with the pronunciation of the NURSE, DRESS and lettER lexical sets among Eʋe-speaking users of English in Ghana.

Specifically, the study seeks to:

1. identify the recurrent phonetic realisations of the NURSE, DRESS and lettER lexical sets;

2. compare the distribution of these realisations between Aŋlɔ and Eʋeme speakers;

3. determine which pronunciation patterns show statistically significant dialect differentiation; and

4. examine the extent to which the observed patterns may also reflect phonological conditioning and individual speaker variation.

The analysis is guided by Wells's (1982) lexical-set framework and considers the extent to which the observed realisations approximate or diverge from the reference pronunciations associated with the three lexical sets.

V. METHODOLOGY

This study adopted a quantitative descriptive design. The approach enabled the systematic description and comparison of naturally occurring pronunciation patterns without experimental manipulation. The study focused on variation in the pronunciation of the NURSE, DRESS and lettER lexical sets among Eʋe speakers of English in Ghana. The descriptive component documented and categorised variation in vowel production, while inferential statistics were used to assess whether the observed pronunciation patterns differed significantly between the dialect groups.

VI. POPULATION AND SAMPLE SIZE

The study involved speakers from two Eʋe dialect groups, Eʋeme and Aŋlɔ, drawn from predominantly Eʋe-speaking communities. The sample comprised 96 participants. Purposive sampling was used to obtain a balanced distribution across gender, age and social-network categories, including male and female speakers, younger and older speakers, and participants with relatively strong and weak social-network ties. All participants were speakers of both Eʋe and English.

VII. ETHICAL CONSIDERATIONS

The study adhered to established ethical principles in linguistic research to ensure the protection, dignity and rights of all participants. Informed consent was obtained before data collection, and participants were informed about the purpose of the study, the nature of their involvement and their right to withdraw at any stage. For participants below the age of 18, permission was obtained from their parents or guardians.

Confidentiality and anonymity were maintained throughout the study. Pseudonyms were

used in place of participants' names, and identifying information was excluded from the analysis and reporting. Participation was voluntary, and no participant was coerced or pressured to take part. Participants were also informed that they could decline to answer any question with which they felt uncomfortable.

The study also sought to respect linguistic and cultural diversity. Because dialect variation may carry social sensitivities, care was taken to avoid stigmatising or negatively evaluating any Eʊe variety. All dialects were treated as linguistically valid varieties.

Measures were also taken to protect the research data. Audio recordings, transcripts and related materials were securely stored and accessed only for academic purposes. The findings were reported accurately and without deliberate manipulation or misrepresentation, and all sources consulted were appropriately acknowledged.

VIII. DATA COLLECTION

Participants completed a controlled word-reading task containing words from the NURSE, DRESS and lettER lexical sets. The target words were intermixed with distractors and read aloud in isolation in order to elicit a relatively formal and controlled speech style.

The reading task was supplemented by a sociolinguistic questionnaire that collected information on participants' ethnic and educational backgrounds, gender, places of residence and travel, exposure to English, and patterns of daily language use. These data provided additional social information that could be considered in relation to the observed pronunciation patterns.

The speech samples were recorded using a Handy4 Next audio recorder. Recordings were made in quiet, minimally reverberant environments in order to maximise signal quality.

IX. DATA ANALYSIS

The data were analysed to determine how the pronunciation of the NURSE, DRESS and lettER lexical sets varied between Eʊeme and Aŋlɔ speakers. The analysis focused primarily on vowel quality, duration, intensity and pitch and was guided by Wells's (1982) lexical-set framework.

The analysis proceeded in two stages: phonetic analysis and statistical analysis. The phonetic analysis was conducted using Praat and focused on vowel quality, represented by F1 and F2, together with vowel duration, intensity and pitch. The observed vowel realisations were subsequently categorised with reference to Received Pronunciation (RP) and the Cardinal Vowel system. The analysis also considered whether patterns in the English vowels could plausibly be associated with phonetic and phonological characteristics of Eʊe.

At the statistical stage, frequencies and percentages were used to describe the distribution of the identified variants. Independent-samples t-tests were then used to compare speaker-level variant frequencies between the Eʊeme and Aŋlɔ groups. Statistical significance was evaluated at $\alpha = .05$.

X. PHONETIC ANALYSIS

The phonetic analysis included measurement of formant frequency, length, intensity and pitch to establish the lexical sets. The measurement was done with Praat signal analysis software version 6.0.12 (Boersma, 2016). This has an inbuilt LPC (Linear Predictive Coding) and a formant tracker to track formant frequencies of vowels as well as the other acoustic cues used to establish the vowel qualities. The measured phonetic features are shown on a spectrogram in Figure 1.

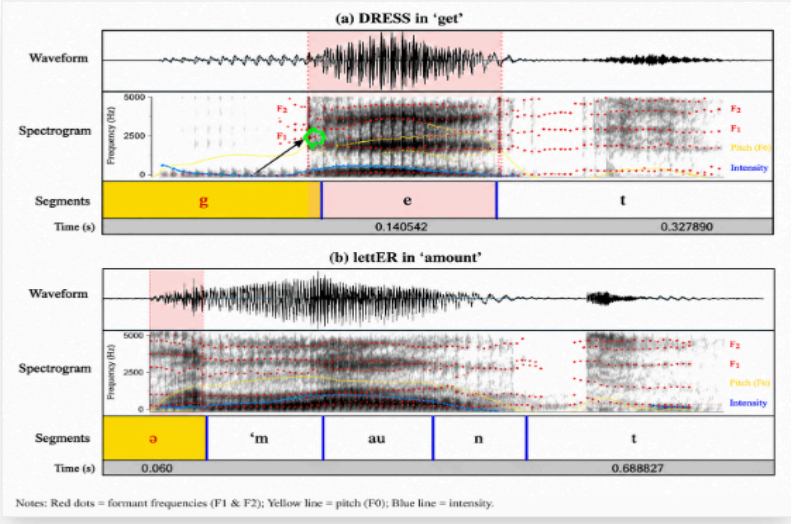


Figure 1: Vowel length, pitch and intensity of the DRESS and LETTER in 'get' and 'amount'

In Figure 1, the red traces represent formant trajectories, while pitch and intensity are shown by the blue and yellow contours, respectively. The vowel intervals were identified by excluding surrounding consonantal material as far as possible. In the token get, the release burst of the initial /g/ was included at the vowel onset, whereas the closure and release of the following /t/ were excluded. The vowel in get had a duration of approximately 0.140 s, while the vowel in amount had a duration of approximately 0.060 s.

The vowel formants were subsequently normalised using the Watt and Fabricius (2002) vowel-normalisation method. The procedure is based on reference points representing the high-front, high-back and low regions of a speaker's vowel space. In practical terms, values associated with vowels such as FLEECE, GOOSE and TRAP are used to establish speaker-specific vowel-space reference points. This allows formant values to be transformed relative to each speaker's vowel system.

The S-procedure therefore identifies three-point vowels corresponding broadly to a speaker's most front, most back and lowest vowel-space positions (Watt & Fabricius, 2002). The method accommodates cross-speaker differences by deriving the reference points from each speaker's own formant values rather than assuming that one lexical vowel necessarily occupies the same extreme position for all speakers. NORM was used to implement this normalisation procedure (see Watt & Fabricius, 2002; Kendall & Thomas, 2010).

Normalising the formant values reduces the influence of physiological differences in vocal-tract size associated with factors such as sex and age. This facilitates direct comparison of vowel positions across speakers and social groups.

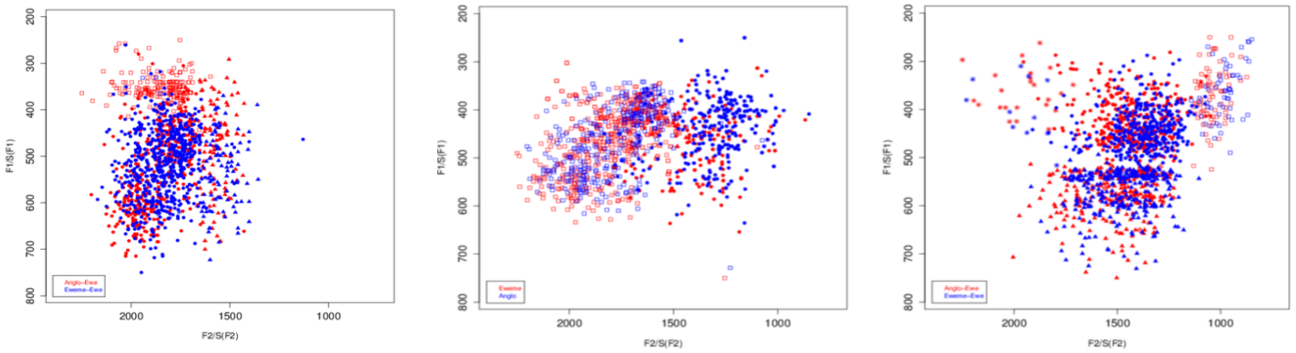
The raw F1 and F2 values for each speaker were first normalised individually. The resulting values were then plotted to represent individual vowel distributions and subsequently used to derive group-mean vowel positions. The identified variants were categorised using the normalised formant values with reference to the Cardinal Vowel system and conventional descriptions of English vowel quality.

Tokens with similar acoustic properties were grouped according to their formant distributions. For example, DRESS tokens with relatively low F1 and high F2 values were located towards the upper-front region of the vowel space, whereas tokens with comparatively lower F2 values occupied more central positions. These acoustic distributions provided the basis for identifying and categorising the recurrent variants used in the subsequent analysis.

XI. THE PHONETIC RESULTS

The acoustic analysis revealed substantial variation across the three lexical sets. Although corresponding vowel qualities are represented within the Eʊe vowel system, the English realisations

varied both across and within speakers. Figure 2 presents the individual-token distributions on S-transformed scales, with F1/S(F1) on the y-axis and (F2-F1)/S(F2-F1) on the x-axis. F1 reflects vowel height, while F2 provides information about vowel frontness and backness (Ladefoged, 1993). To improve the clarity of the plot, the number of tokens displayed for each lexical set was reduced to one-third through random selection.



Dress Nurse Letter

Figure 2: Individual F1 & F2 of the DRESS, NURSE and lettER with F1/S (F1) plotted on the y-axis, F2-F1/S (F2-F1) on the x-axis

The individual-token distributions reveal substantial variability and overlap among the three lexical sets. The DRESS vowel space for Aŋlɔ speakers is relatively wider in the F1 dimension than that of Eʋeme speakers. NURSE tokens produced by Aŋlɔ speakers occupy comparatively more central positions, corresponding to lower F2 values, whereas Eʋeme speakers show a greater concentration of relatively fronted NURSE realisations with higher F2 values.

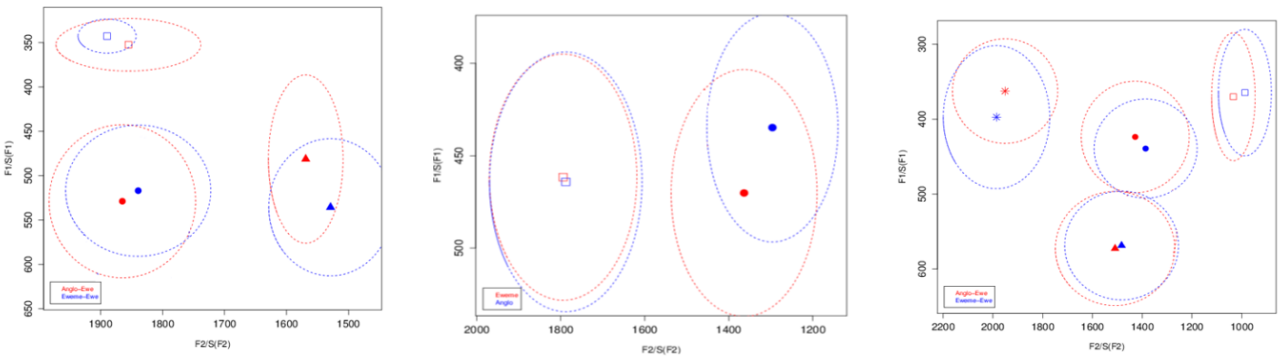
Among the three sets, lettER displays the widest range of phonetic realisations. Although some speakers produced the reduced [ə] commonly associated with unstressed lettER, others produced full-vowel variants such as [ɪ], [o] and [ʌ]. The occurrence of these full-vowel realisations is consistent with limited vowel reduction in Eʋe-influenced English.

DRESS also shows considerable variation. Three recurrent realisations were identified: a retracted-mid [e̞], a raised [ɪ] and a relatively central [ɜː]. This variation is noteworthy because Eʋe contains front mid-vowel qualities that might be expected to provide a relatively close phonetic basis for English DRESS. The observed distribution nevertheless indicates substantial variability in both vowel height and centrality. Such variation may reflect differences in dialect background, phonetic environment and individual speaker behaviour.

NURSE, typically represented as a mid-central vowel /ɜː/ in RP, displayed two principal realisations: a relatively fronted [e̞ː] and a relatively central [ɜː]. Since Eʋe does not provide an exact equivalent of RP /ɜː/, speakers may map the vowel onto phonetic categories available within their existing vowel systems. The resulting alternation between fronted and central realisations is therefore compatible with phonological adaptation, although the dialectal distribution of the variants must also be considered.

Unlike NURSE, which displayed two principal variants, DRESS and lettER exhibited more than two recurrent realisations. Using the Cardinal Vowels and conventional descriptions of RP vowels as reference points, DRESS was categorised as retracted-mid [e̞], raised [ɪ] and central [ɜː]. The lettER variants were categorised as raised-front [ɪ], mid-central [ə], back [o] and lower-central [ʌ]. NURSE was categorised as fronted [e̞ː] and central [ɜː]. These recurrent realisations provided the basis for the subsequent statistical analysis.

Figure 3 presents the group-mean distributions and provides a clearer view of the relative positions of the variants.

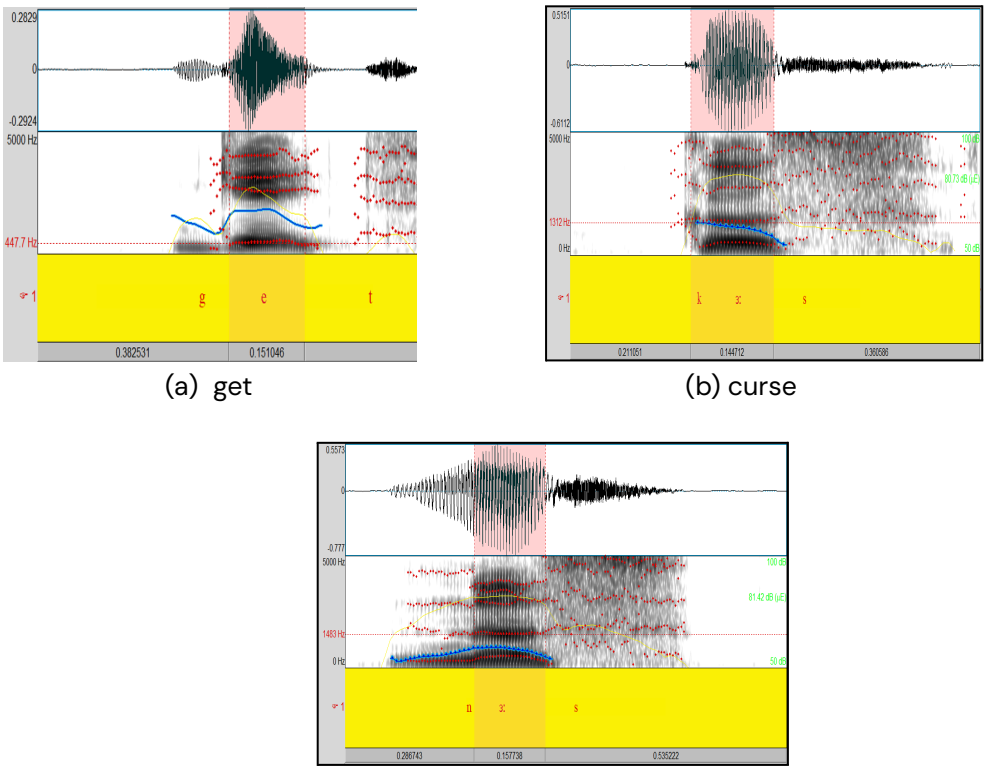


Dress Nurse Letter

Figure 3: Mean F2 & F1 of /e/, /ə/ and /ɜː/ with F1/S (F1) plotted on the y- axis, F2-F1/S (F2-F1) on the x-axis

The group-mean values show considerable crowding within the vowel space. Relatively high-front and mid-front qualities occur towards the upper-front region, while more central and back qualities occupy the middle and upper-back areas of the vowel space. These mean positions confirm that the three lexical sets are not represented by single invariant phonetic targets.

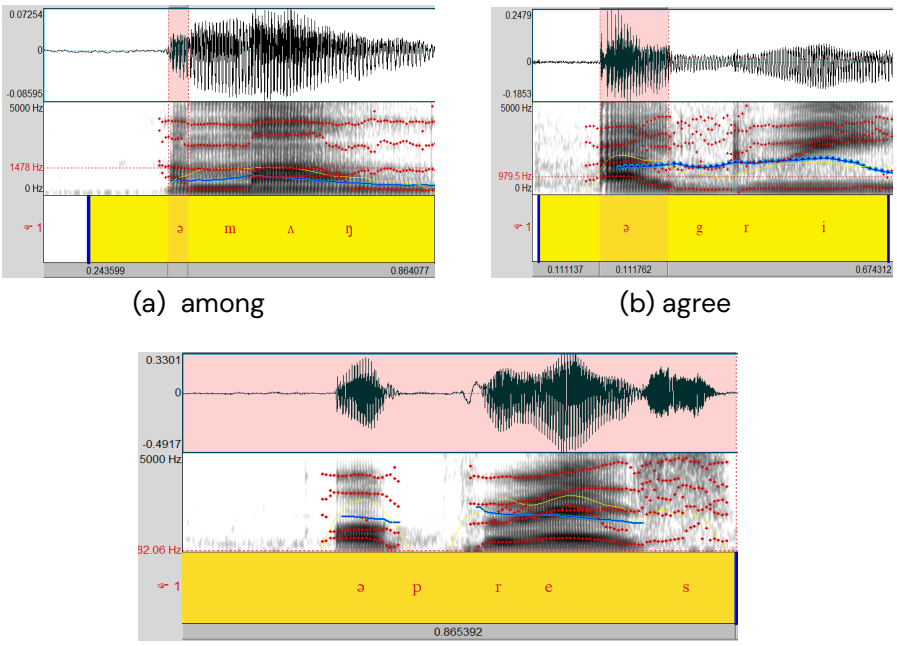
Vowel duration was also examined. The NURSE vowels in curse and heard, and the DRESS vowel in get, were comparatively longer than the lettER vowels in among, agree and oppress. Some variation was also observed in pitch and intensity, although these differences were not treated as primary variables in the subsequent statistical analysis.



(a) get (b) curse

(c) nurse

Figure 4: Spectrograms of DRESS in 'get', and NURSE in 'curse' and 'nurse'



(a) among (b) agree

(c) oppress

Figure 5: Spectrograms of letter in 'among', 'agree' and 'oppress'

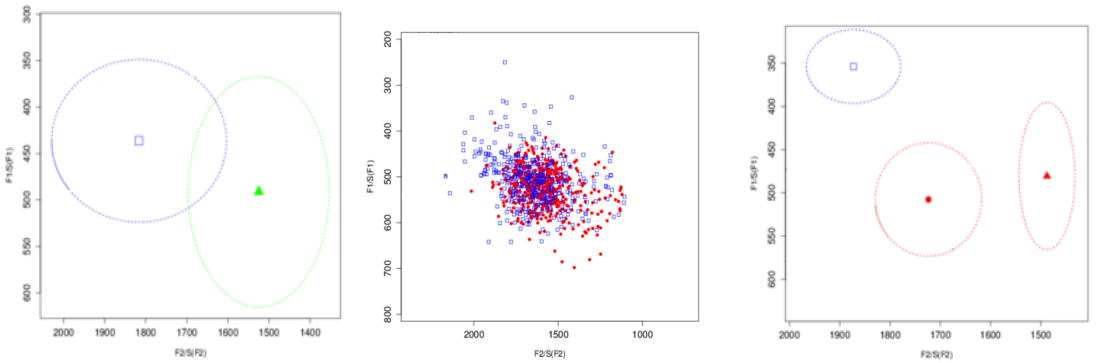
The F2 value of NURSE in curse was higher than that in nurse, indicating a relatively more fronted articulation. DRESS in get was realised as [ɪ], while the lettER vowels in among, agree and oppress were realised as [ə], [ʌ] and [o], respectively.

The NURSE tokens were generally among the longest in duration. The two long NURSE variants, [eː] and [ɜː], had many tokens clustered around 0.170 and 0.168 seconds, respectively, with longer individual tokens extending to approximately 0.334 and 0.400 seconds. DRESS showed shorter average durations, approximately 0.092, 0.111 and 0.113 seconds across its recurrent variants, while lettER variants averaged approximately 0.073, 0.117 and 0.119 seconds.

These values should be interpreted cautiously because phonological context may influence vowel duration. Tokens such as third, curse, heard, head and said, as well as vowels occurring adjacent to stops in words such as pen, creator and letter, showed substantial durational variation. Duration was therefore treated as a supporting acoustic property rather than as an independent categorical basis for variant classification.

XII. THE DRESS AND NURSE LEXICAL SETS

Figure 6 presents the individual and mean normalised formant distributions of DRESS and NURSE.



(a) Individual F1 &2 (a) Mean F1 & F2 of DRESS (b) Mean F1 & F2 of NURSE

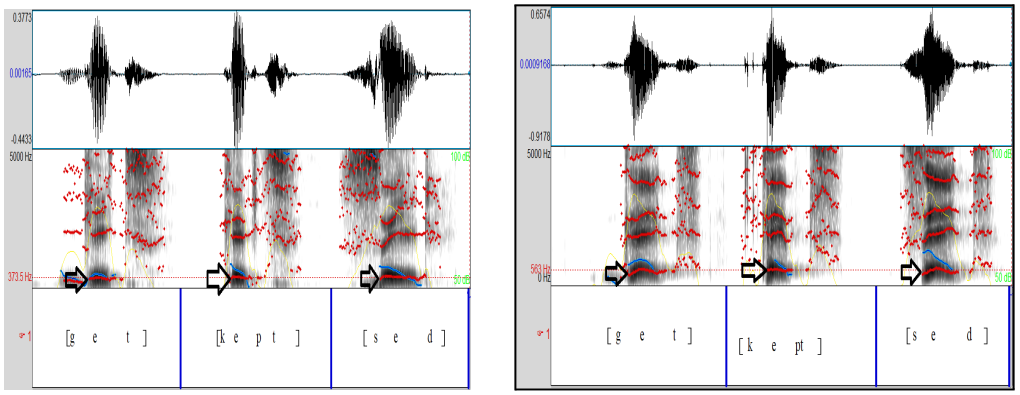
Figure 6: Individual and mean F2&F1 values of DRESS and NURSE, plotted on S-transformed scales, F1/S (F1) on the y- axis, F2-F1/S (F2-F1) on the x-axis

The two lexical sets overlap considerably in acoustic space. NURSE extends from relatively central to fronted positions, while DRESS extends from fronted positions towards more central regions. DRESS nevertheless differs from NURSE in that some of its tokens are raised towards the acoustic space associated with KIT /ɪ/.

Three recurrent DRESS realisations were identified: raised [ɪ], retracted-mid [e̞] and central [ɜː]. NURSE, by contrast, displayed two principal realisations: fronted [e̟ː] and central [ɜː]. The central NURSE variant corresponds broadly to the [ɜː] quality described for non-rhotic British English.

The overlap between the two sets indicates that some speakers reduce the phonetic distance between DRESS and NURSE. Similarly, some DRESS tokens approach the acoustic region associated with KIT. These patterns point to differences among individual speakers rather than to a complete categorical merger across the speech community.

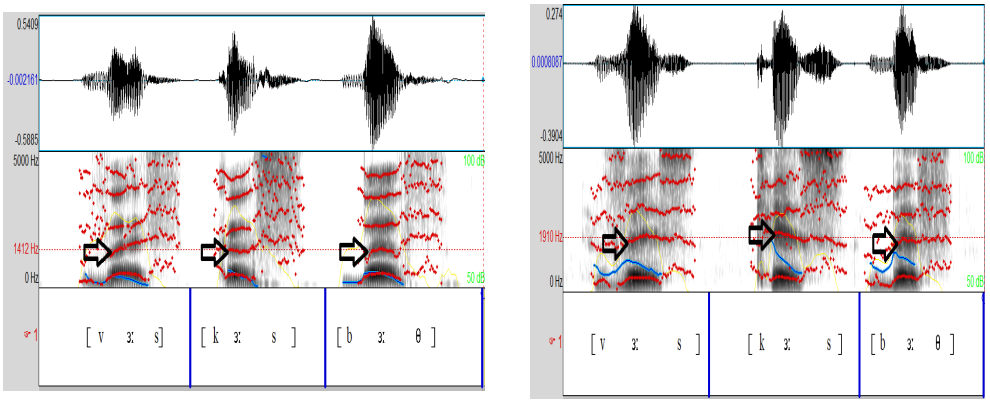
Figure 7 illustrates speaker variation in DRESS using the words get, kept and said



(a) CS (b) DA

Figure 7: Spectrogram of CS and Da saying 'get', 'kept', 'said' of DRESS

The mean F1 values of the three DRESS tokens produced by CS were approximately 370 Hz, whereas those produced by DA averaged approximately 560 Hz, a difference of about 190 Hz. This contrast indicates substantial speaker-level variation in vowel height. CS produced a comparatively raised DRESS quality, while DA produced a lower vowel closer to the expected mid-front region.
A comparable pattern occurs for NURSE, as illustrated in Figure 8.



(a) AA (b) EA

Figure 8: Spectrogram of AA and EA pronouncing 'verse', 'curse', 'birth' of NURSE

The F2 values of the NURSE tokens produced by AA averaged approximately 1412 Hz, whereas those produced by EA averaged approximately 1910 Hz. The lower F2 values produced by AA correspond to a more central vowel quality, while the higher F2 values produced

by EA indicate a more fronted articulation. This speaker contrast reflects the wider fronted–central distribution observed for NURSE.

The DRESS data also show evidence of raising towards [ɪ]. Words such as pen, head, get and said were realised by some speakers with [ɪ]-like vowel qualities, producing forms such as [pɪn], [hɪd], [gɪt] and [sɪd]. This pattern resembles the acoustic convergence commonly discussed in relation to the PIN–PEN merger, although the present data demonstrate phonetic overlap rather than establishing a complete phonological merger across all speakers.

The raised [ɪ] realisation differs from some earlier descriptions of Aŋlɔ English pronunciation. Sackeyfio (1996), for example, reported [eɪ]-like realisations of DRESS among Aŋlɔ speakers. The present findings instead indicate raising towards [ɪ] among some speakers.

DRESS raising has been reported in several other English varieties. Wells (1982), for instance, describes raised DRESS qualities in South African English, while Maclagan and Hay (2004) report raising and overlap between DRESS and KIT in New Zealand English. Maclagan, Gordon and Lewis (1999) similarly observed closer DRESS realisations among some younger female speakers. Wells (1982) and Cruttenden (2001) also describe raised DRESS qualities in Cockney.

DRESS retraction is likewise not unique to Eʋe speakers. Hawkins and Midgley (2005) reported comparatively low F2 values for DRESS, while Harrington, Palethorpe and Watson (2000) identified diachronic changes in the Queen's speech that included retraction of the vowel. These studies demonstrate that DRESS may vary along both height and frontness dimensions across English varieties.

The acoustic overlap between DRESS and NURSE among some Eʋe speakers is therefore noteworthy but not unprecedented. Even where Eʋe provides a comparatively close front-vowel quality for DRESS, the English vowel may still display raising, retraction or centralisation. This suggests that the observed patterns cannot be explained solely through straightforward L1 vowel substitution.

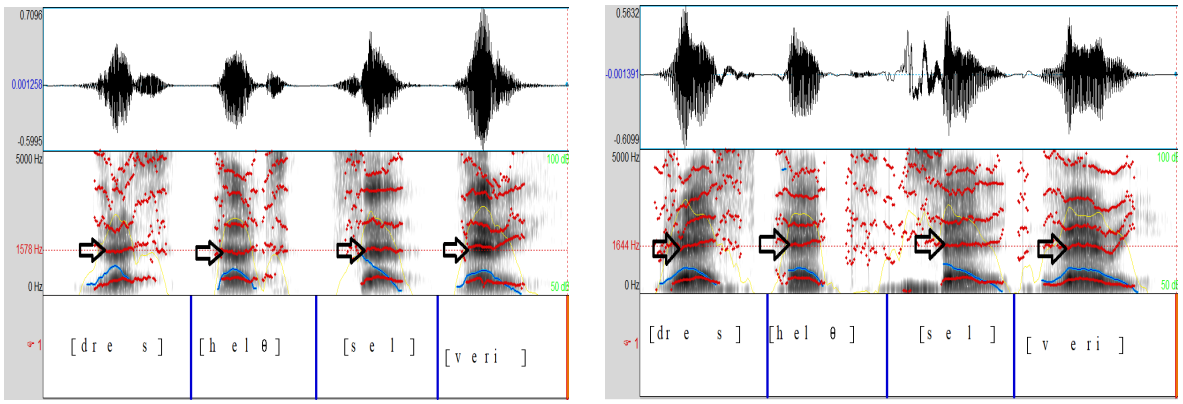
NURSE itself is highly variable across English varieties. Wells (1982) documents variation in rhoticity and vowel quality across British, American, Irish and Scottish varieties. The present study identified a small number of r-coloured NURSE realisations, but these were too infrequent to constitute a major variant category. The dominant contrast was instead between the fronted [e̟ː] and central [ɜː] realisations.

NURSE fronting in the present study is also broadly consistent with observations by Schmied (2009), who reported relatively high F2 values for NURSE in an African English context. In the present data, however, the dialectal distribution of fronted NURSE is of particular importance and is examined statistically in the following section.

Phonological context also contributed to variability in DRESS. In several tokens, F2 values were comparatively low adjacent to /r/, /l/ and /m/, as in friend, very, dress, health, sell and assembly. This pattern is consistent with known coarticulatory effects of neighbouring consonants.

The lowering effect of /l/ on the F2 of adjacent vowels has been reported by Bladon and Al-Bamerni (1976) and Tunley (1999). Tunley observed comparatively low F2 and F3 values in vowels occurring in /rV/ and /lV/ sequences.

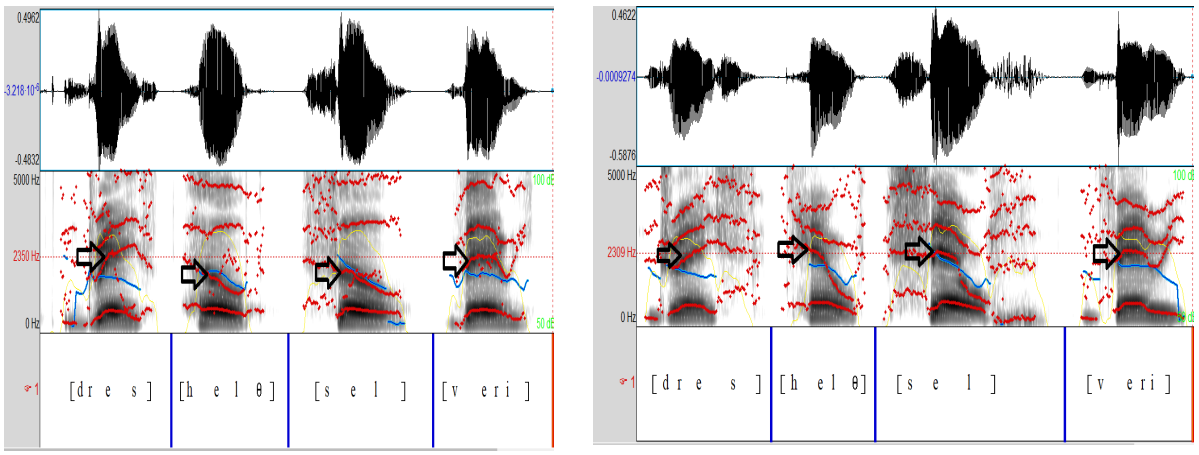
However, phonetic environment alone does not account for all of the variation. Figure 9 compares the DRESS productions of speakers FA and HB.



(a) FA (b) HB

Figure 9: Spectrograms of speakers FA and HB producing DRESS in dress, health, sell and very

FA and HB produced broadly similar F2 values, around 1600 Hz, across several tokens despite differences in phonological environment. Other speakers, including MK and GA, produced considerably higher F2 values for comparable words, except in particular tokens such as health. These differences demonstrate that the same phonological contexts did not produce uniform acoustic outcomes across speakers.



(a) (b)

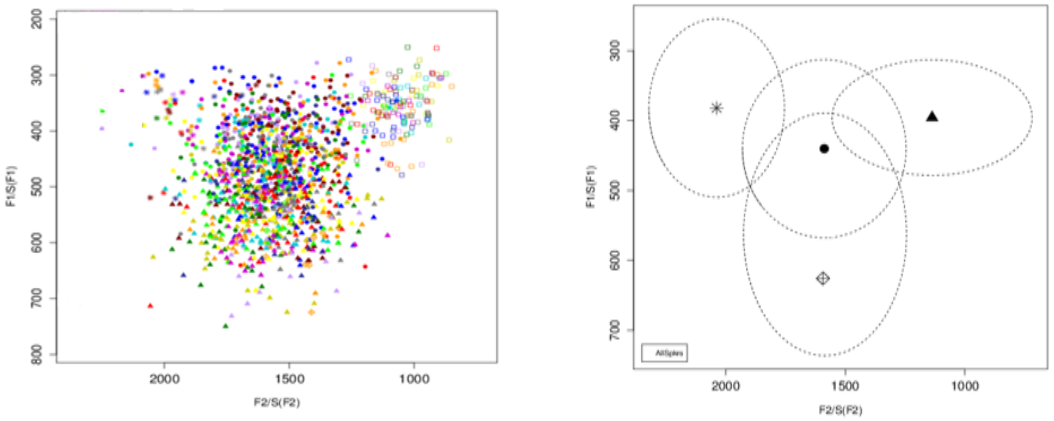
Figure 10: Spectrograms of speakers MK and GA producing DRESS in dress, health, sell and very

MK produced relatively centralised DRESS qualities in health and sell but more fronted realisations in dress and very. GA likewise showed variation across words. These patterns suggest that consonantal environment may contribute to F2 lowering, but speaker-level differences are also involved.

The DRESS variation is therefore best interpreted as the result of multiple interacting influences. Coarticulatory context may contribute to particular acoustic realisations, while dialect background and individual speaker behaviour may account for additional variation. The relative contribution of dialect is examined quantitatively in the statistical analysis that follows.

XIII. THE LETTER LEXICAL SET

The lettER vowel displays a high degree of variation in both height and backness. Figure 11 presents the individual and mean F1 and F2 values of the lettER tokens on S-transformed scales, with F1/S(F1) on the y-axis and (F2-F1)/S(F2-F1) on the x-axis.



(a) Individual F1 & F2 (b) Mean F1 & F2

Figure 11: Individual and mean F1 & F2 of the LETTER, plotted on S-transformed scales, F1/S(F1) on y- axis, F2-F1/S(F2-F1) on the x-axis

The distributions show that lettER occupies a broad area of the acoustic vowel space. Relative to conventional descriptions of RP vowel qualities, the tokens extend across raised, central and relatively back positions. On this basis, four recurrent lettER realisations were identified: raised-front [ɪ], mid-central [ə], lower-central [ʌ] and back [o].

The degree of acoustic overlap indicates that some lettER tokens approach vowel qualities associated with other English vowel categories. This is particularly evident in the relationship between [ə] and [ʌ], whose acoustic distributions may be difficult to distinguish in some productions. In English more generally, the phonetic relationship between schwa and STRUT varies across accents and phonological contexts. In the present study, however, the occurrence of both [ə]-like and [ʌ]-like realisations is treated as evidence of phonetic variability rather than as evidence of a complete merger between the two vowels.

Schwa itself is well known for substantial phonetic variability. Its realisation may vary according to speaker, speaking style and phonological environment. Delattre (1965), for example, reported extensive variability among unstressed vowels in English, while Lass (2006) described several distinct phonetic qualities represented by the conventional symbol [ə]. Such observations demonstrate that a single phonemic label may encompass considerable phonetic variation.

The occurrence of a reduced [ə] variant in the present data is therefore noteworthy, particularly in light of earlier descriptions that have reported limited vowel reduction in Ghanaian English and other non-native English varieties. At the same time, the full-vowel realisations [ɪ], [ʌ] and [o] show that lettER is not produced uniformly across the speakers examined.

Some of this variation may be attributable to coarticulation. Schwa is particularly susceptible to the influence of neighbouring segments because of its relatively short duration and weakly specified articulatory target. Unstressed vowels may therefore vary considerably across phonological contexts because their articulatory realisations are influenced by surrounding consonants and vowels.

Variation in F1 may reflect the height of neighbouring vowels and the articulatory effects of adjacent consonants. Since F1 generally increases as vowel height decreases, schwa occurring near low-vowel articulations may show relatively higher F1 values, whereas contexts involving high vowels may favour lower F1 values. These effects are not automatic, however, because consonantal articulation may simultaneously influence vowel formants.

Stop consonants, for example, may affect adjacent formant trajectories through the constriction associated with closure and release. In a word such as creator, the realisation of the final schwa may therefore reflect not only the vowel qualities of neighbouring syllables but also the

articulatory influence of the preceding /t/. Similarly, schwa in about, agree and creator may differ acoustically from schwa following fricatives or approximants because the surrounding consonantal gestures impose different constraints on the vocal tract.

Variation in F2 may likewise be conditioned by phonological context. Relatively high F2 values are generally associated with more fronted tongue positions, whereas lower F2 values are associated with more central or back articulations. Schwa occurring near front vowels may consequently exhibit higher F2 values, while adjacent back vowels, liquids and some consonantal constrictions may contribute to lower F2 values. Thus, the schwa in words such as father, doctor and colour may be affected by the articulatory properties of surrounding segments.

These patterns are consistent with the general principle of coarticulation: articulatory movements for one segment overlap temporally with those of neighbouring segments. Because the articulators are already moving towards upcoming targets while completing preceding ones, the acoustic realisation of a short unstressed vowel may be strongly influenced by its local phonological environment.

Duration may further increase this susceptibility. Shorter vowels may fail to reach fully specified acoustic targets, especially where the articulatory distance between neighbouring segments is substantial (Lindblom, 1963). The short duration of many lettER tokens may therefore contribute to their variable positions in the vowel space.

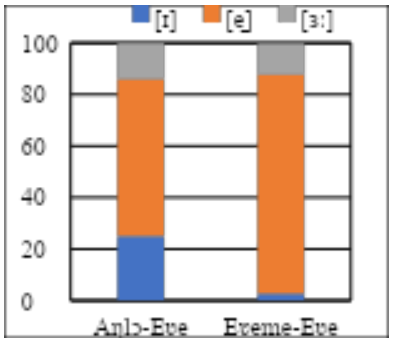
The contextual explanations proposed here should nevertheless remain tentative. Although some tendencies are visible across particular phonological environments, speakers do not respond uniformly to the same contexts. A schwa occurring in the same or a similar environment may exhibit relatively high F2 for one speaker and lower F2 for another. Phonological context alone therefore cannot account for the full range of variation.

The observed lettER variability may also reflect dialectal, social and idiolectal influences. Raised [ɪ]-like or backed [o]-like realisations, for example, may be associated with differences among speakers in dialect background, age, gender, mobility, social-network position or exposure to other English varieties. The present acoustic evidence establishes the existence of these recurrent variants, while the statistical analysis in the following section examines the extent to which their distribution is associated with dialect background.

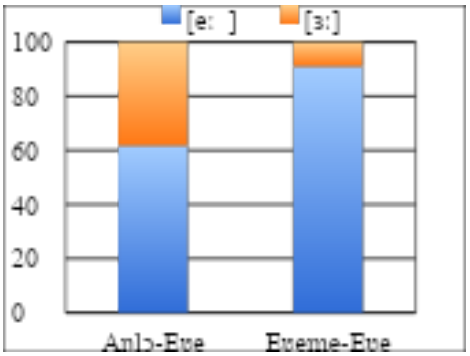
XIV. RESULTS BY DIALECT GROUP

The seven distinct phonetic qualities identified across the three lexical sets were compared between Aŋlɔ and Eʋeme speakers using independent-samples t-tests based on speaker-level frequencies of the lexical-set-specific variants. Figure 12 summarises the percentage distributions of the variants by dialect.

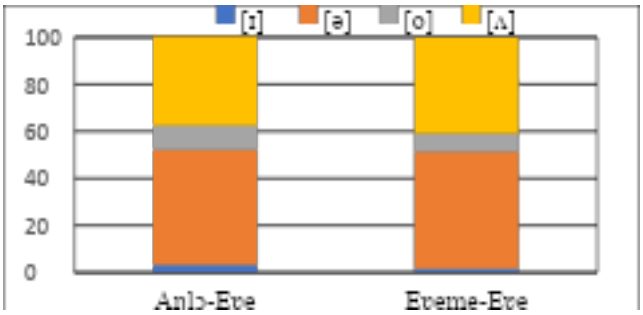
Aŋlɔ speakers produced all three DRESS variants, [ɪ], [e̞] and [ɜː], whereas Eʋeme speakers strongly favoured [e̞] and showed very limited use of [ɪ]. For NURSE, Eʋeme speakers favoured the fronted [e̟ː] variant, whereas Aŋlɔ speakers showed substantially greater use of the central [ɜː] variant while also producing [e̞ː]. The lettER variants showed more similar distributions across the two dialect groups.



(a) DRESS



(b) NURSE



(c) LETTER

Figure 12: Percentage (%) distribution of the DRESS, NURSE and the LETTER according to dialect

NURSE

Table 1: Distribution of NURSE variants by dialect

Variant	Dialect	N	M	SD	t	df	p	η²
[e̞:]	Anlɔ-Eʋe	48	9.250	6.086	-4.708	94	< .001	.191
	Eʋeme-Eʋe	48	13.625	2.101				
[ɜ:]	Anlɔ-Eʋe	48	5.740	6.000	4.757	94	< .001	.194
	Eʋeme-Eʋe	48	1.375	2.101				

Both NURSE variants differed significantly between the dialect groups. Eʋeme speakers produced the fronted [e̞:] variant more frequently (M = 13.625, SD = 2.101) than Anlɔ speakers (M = 9.250, SD = 6.086), t(94) = −4.708, p < .001, η² = .191. The central [ɜ:] variant showed the reverse pattern: Anlɔ speakers produced it more frequently (M = 5.740, SD = 6.000) than Eʋeme speakers (M = 1.375, SD = 2.101), t(94) = 4.757, p < .001, η² = .194. These results indicate substantial dialect-related differentiation in the distribution of the two NURSE variants.

DRESS

Table 2. Distribution of DRESS variants by dialect

Variant	Dialect	N	M	SD	t	df	p	η²
[ɪ]	Anlɔ-Eʋe	48	3.833	5.669	4.512	94	< .001	.178
	Eʋeme-Eʋe	48	0.125	0.531				
[e̞]	Anlɔ-Eʋe	48	8.896	5.875	-4.614	94	< .001	.185
	Eʋeme-Eʋe	48	12.958	1.637				
[ɜ:]	Anlɔ-Eʋe	48	2.271	2.566	0.819	94	.415	.007
	Eʋeme-Eʋe	48	1.917	1.541				

For DRESS, the raised [ɪ] variant occurred significantly more frequently among Aŋlɔ speakers (M = 3.833, SD = 5.669) than among Eʋeme speakers (M = 0.125, SD = 0.531), t(94) = 4.512, p < .001, η² = .178.

The retracted-mid [e̞] variant showed the opposite distribution, occurring significantly more frequently among Eʋeme speakers (M = 12.958, SD = 1.637) than among Aŋlɔ speakers (M = 8.896, SD = 5.875), t(94) = -4.614, p < .001, η² = .185.

The central [ɜː] DRESS variant did not differ significantly between the dialect groups, t(94) = 0.819, p = .415, η² = .007. The DRESS results therefore show clear dialect differentiation for [ɪ] and [e̞], but not for [ɜː].

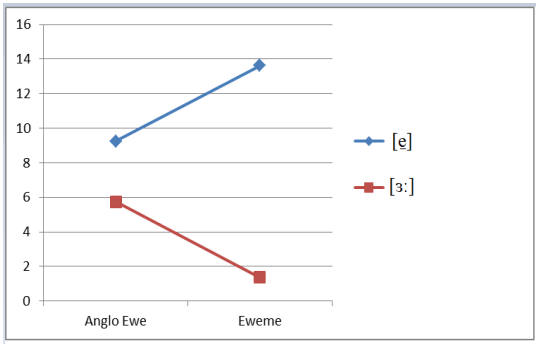
lettER

Table 3: Distribution of lettER variants by dialect

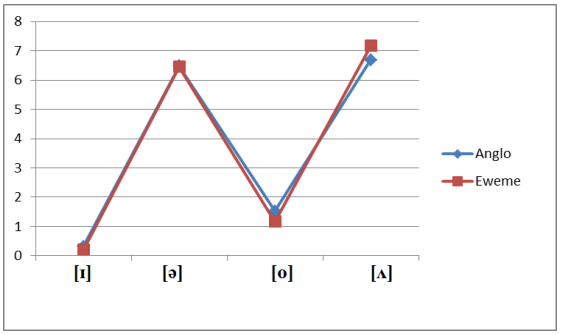
Variant	Dialect	N	M	SD	t	df	p	η²
[ɪ]	Aŋlɔ-Eʋe	48	0.313	0.589	0.974	94	.332	.010
	Eʋeme-Eʋe	48	0.208	0.459				
[ə]	Aŋlɔ-Eʋe	48	6.479	3.725	0.027	94	.978	< .001
	Eʋeme-Eʋe	48	6.458	3.809				
[o]	Aŋlɔ-Eʋe	48	1.521	0.772	2.516	94	.014	.063
	Eʋeme-Eʋe	48	1.167	0.595				
[ʌ]	Aŋlɔ-Eʋe	48	6.687	3.327	-0.681	94	.498	.005
	Eʋeme-Eʋe	48	7.167	3.575				

The lettER set showed considerably less dialect differentiation. The between-group differences for [ɪ], [ə] and [ʌ] were not statistically significant. Only [o] differed significantly, with Aŋlɔ speakers producing it more frequently (M = 1.521, SD = 0.772) than Eʋeme speakers (M = 1.167, SD = 0.595), t(94) = 2.516, p = .014, η² = .063. The effect was moderate and notably smaller than those observed for the significant DRESS and NURSE contrasts.

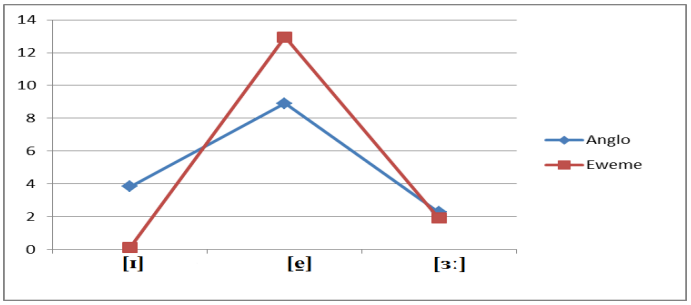
Taken together, the statistical results show clear dialect-related differentiation for the DRESS and NURSE variants, but substantially weaker differentiation for lettER. The effect sizes for the significant DRESS and NURSE contrasts ranged from η² = .178 to .194, whereas the significant lettER [o] contrast yielded η² = .063.



(a) NURSE



(b) LETTER



(c) DRESS

Figure 13: Group mean frequencies of NURSE, lettER and DRESS variants by dialect

XV. DISCUSSION

The results indicate that Aŋlɔ and Eʋeme speakers differ systematically in their use of the DRESS and NURSE variants, whereas the lettER variants show comparatively little dialect differentiation. These patterns are consistent with an association between dialect background and vowel realisation, but dialect should not be treated as the sole source of variation. The two groups are also associated with different geographical locations and patterns of linguistic exposure, and the present design does not isolate the independent contribution of each factor.

The DRESS findings are particularly informative. Aŋlɔ speakers showed substantially greater use of the raised [ɪ] variant, whereas Eʋeme speakers strongly favoured the retracted-mid [ɐ] variant. By contrast, the central [ɜː] variant did not differ significantly between the groups. The DRESS distribution therefore appears to reflect more than direct transfer from a single Eʋe vowel quality and may involve an interaction among dialect background, phonetic environment and speaker-specific behaviour.

The NURSE results reveal an equally clear dialect contrast. Eʋeme speakers favoured the fronted [e̟ː] variant, whereas Aŋlɔ speakers produced the central [ɜː] variant substantially more frequently. Since Eʋe does not provide an exact equivalent of RP /ɜː/, speakers may map NURSE onto phonetic categories available within their existing dialectal repertoires. The observed NURSE fronting is consistent with reports of fronted NURSE qualities in other English varieties, although the present study does not establish that the same historical or phonological processes are involved.

The acoustic evidence also indicates that phonological context contributes to variation. In the DRESS data, comparatively low F2 values were frequently observed adjacent to /r/, /l/ and /m/, consistent with known coarticulatory effects. Speakers did not, however, respond uniformly to the same environments. Contextual conditioning therefore provides only a partial explanation, while dialectal, social and idiolectal factors may account for additional variation.

The lettER set displayed the greatest phonetic variability but the weakest dialect differentiation. Its realisations ranged from reduced [ə] to full-vowel variants [ɪ], [ʌ] and [o]. Only [o] showed a statistically significant dialect difference, with a moderate effect size. These findings suggest that shared phonological tendencies, contextual effects and individual production patterns may contribute more strongly to lettER variation than dialect membership alone.

The role of geography should also be interpreted cautiously. Aŋlɔ and Eʋeme speakers are associated with different speech communities and potentially different histories of linguistic contact. Nevertheless, the present cross-sectional design demonstrates association rather than causation. Mobility, education, media exposure and patterns of social interaction may also contribute to pronunciation differences. Future research should therefore examine dialect, geographical location, age, gender, network strength and phonological context simultaneously within a multivariate framework.

Overall, the findings demonstrate that internal dialect diversity within Eʋe is associated with systematic differences in English vowel production,

particularly for DRESS and NURSE. At the same time, substantial overlap between the groups and variability within each group indicate that these relationships are probabilistic rather than categorical.

XVI. FINDINGS AND CONCLUSION

The study identified substantial variation in the pronunciation of the DRESS, NURSE and lettER lexical sets among Aŋlɔ and Eʋeme speakers of English in Ghana. The lettER set showed the widest range of phonetic realisations—[ɪ], [ʌ], [o] and [ə]—but comparatively little dialect differentiation. DRESS displayed three recurrent variants, [ɪ], [e̞] and [ɜː], with significant dialect differences for [ɪ] and [e̞], but not for [ɜː]. NURSE displayed two principal variants, [e̞ː] and [ɜː], both of which differed significantly between the dialect groups.

The findings suggest a continuum of pronunciation patterns ranging from more localised realisations to forms that more closely approximate RP. This continuum should not be interpreted as evidence of two sharply separated varieties. Rather, speakers differed in the relative frequencies with which they produced RP-approximating and alternative realisations, demonstrating considerable internal variability within Eʋe English.

Dialect background does not operate in isolation. Coarticulatory context, individual speaker behaviour, mobility and broader patterns of language contact may all contribute to the observed variation. The DRESS and NURSE results provide the clearest evidence of dialect-linked differentiation, whereas the lettER findings point more strongly to shared phonological tendencies and speaker-level variation across the two groups.

The study therefore contributes to a more internally differentiated description of Ghanaian English. It demonstrates that Eʋe-speaking users of English should not be treated as a homogeneous group and that dialect background is relevant to the sociophonetic analysis of pronunciation. The findings also have implications for pronunciation pedagogy and intelligibility assessment, where internal variation within Ghanaian English should be recognised rather than evaluated solely against external pronunciation norms.

Future research using token-level mixed-effects models and spontaneous-speech data would provide a stronger basis for separating the contributions of dialect, speaker, lexical item and phonological context. Such work would help clarify how internal dialect diversity interacts with broader social and linguistic factors in shaping the phonetic organisation of Ghanaian English.

XVII. AI-ASSISTED EDITING DISCLOSURE

During the final proofreading of this manuscript, the author used OpenAI's ChatGPT for language editing, proofreading and consistency checking. All revisions were critically reviewed and verified by the author, who retain full responsibility for the content, data, analysis, interpretation and conclusions of the work. Generative AI was not used to generate or alter the research data or scientific findings.

XVIII. REFERENCES

1. Ansre, G. (1961). The tonal structure of Eʋe. Hartford Studies in Linguistics. Hartford Seminary Foundation.
2. Ansre, G. (2000). The Eʋe language. In K. Gavua (Ed.), A handbook of Eʋeland: Vol. II. The Northern Eʋe in Ghana (pp. 22–47). Woeli Publishing Services.
3. Atakpa, F. K. (1997). The naming system of the Eʋe. In F. Agbodeka (Ed.), A handbook of Eʋe: Vol. 1. The Eʋe of Southern Ghana (pp. 177–192). Woeli Publishing Services.
4. Awoonor-Aziaku, L. (2015). The effect of Englishisation on language use among the Eʋe of Southern Volta in Ghana. International Journal of English Language and Literature Studies, 4(4), 192–202.
5. Awoonor-Aziaku, L. (2018). Variation study of the Received Pronunciation (RP) vowel phonemes /e/, /ɜː/ and /ə/ among Eʋe speakers of English in Ghana. Universitätsbibliothek Johann Christian Senckenberg.
6. Bertho, J. (1946). Adja-Tado, races et langues du Bas-Dahomey et du Bas-Togo. Grands Lacs, 61, 57–59.
7. Bladon, R. A. W., & Al-Bamerni, A. (1976). Coarticulation resistance in English /l/. Journal of Phonetics, 4, 137–150.
8. Boersma, P. (2001). Praat, a system for doing phonetics by computer. Glot International, 5(9/10), 341–345.
9. Capo, H. B. C. (1991). A comparative phonology of Gbe. Foris.

10. Chambers, J. K., & Trudgill, P. (1998). Dialectology (2nd ed.). Cambridge University Press.
11. Cruttenden, A. (2001). Gimson's pronunciation of English (6th ed.). Edward Arnold.
12. Dakubu, M. E. K. (1977). The contribution of linguistics to the study of Ghanaian history. In J. O. Hunwick (Ed.), Proceedings of the Seminar on Ghanaian Historiography and Historical Research, 20th–22nd May 1976 (pp. 26–43). Department of History, University of Ghana.
13. de Medeiros, F. (Ed.). (1984). Peuples du Golfe du Bénin: Aja-Ewe (Colloque de Cotonou). Karthala.
14. Delattre, P. (1965). Comparing the phonetic features of English, French, German and Spanish: An interim report. Julius Groos.
15. Ellis, A. B. (1890). The Ewe-speaking peoples of the Slave Coast of West Africa: The religion, manners, customs, laws and languages. Chapman and Hall.
16. Gavua, K. (Ed.). (2000). A handbook of Eʋeland: Vol. II. The Northern Eʋe in Ghana. Woeli Publishing Services.
17. Greenberg, J. H. (1963). The languages of Africa. Indiana University Press.
18. Harrington, J., Palethorpe, S., & Watson, C. (2000). Monophthongal vowel changes in Received Pronunciation: An acoustic analysis of the Queen's Christmas broadcasts. Journal of the International Phonetic Association, 30, 63–78.
19. Hawkins, S., & Midgley, J. (2005). Formant frequencies of RP monophthongs in four age groups of speakers. Journal of the International Phonetic Association, 35(2), 183–199.
20. Kachru, B. B., Kachru, Y., & Nelson, C. L. (Eds.). (2006). The handbook of World Englishes. Blackwell.
21. Kendall, T., & Thomas, E. R. (2010). Vowels: Vowel manipulation, normalization, and plotting in R (Version 1.1) [R package].
22. Ladefoged, P. (1993). A course in phonetics (3rd ed.). Harcourt Brace College Publishers.
23. Lass, R. (2006). Phonology and morphology. In R. Hogg & D. Denison (Eds.), A history of the English language (pp. 43–108). Cambridge University Press.
24. Lindblom, B. (1963). Spectrographic study of vowel reduction. Journal of the Acoustical Society of America, 35, 1773–1781.
25. Maclagan, M. A., Gordon, E., & Lewis, G. (1999). Women and sound change: Conservative and innovative behavior by the same speakers. Language Variation and Change, 11(1), 19–41.
26. Maclagan, M., & Hay, J. (2004). The rise and rise of New Zealand English DRESS. In Proceedings of the 10th Australian International Conference on Speech Science and Technology (pp. 183–188).
27. Pazzi, R. (1979). Introduction à l'histoire de l'aire culturelle Ajatado. Institut National des Sciences de l'Éducation, Université du Bénin.
28. Sackeyfio, N. A. (1996). Let's teach English. Assemblies of God Literature Centre.
29. Schmied, J. (2009). East African English: Kenya, Uganda, Tanzania. John Benjamins.
30. Schneider, E. W. (2007). Postcolonial English: Varieties around the world. Cambridge University Press.
31. Trudgill, P. (1999). The dialects of England (2nd ed.). Blackwell.
32. Tunley, A. (1999). Coarticulatory influences of liquids on vowels in English [Doctoral dissertation, University of Cambridge].
33. Watt, D. J. L., & Fabricius, A. H. (2002). Evaluation of a technique for improving the mapping of multiple speakers' vowel spaces in the F1–F2 plane. Leeds Working Papers in Linguistics and Phonetics, 9, 159–173.
34. Wells, J. C. (1982). Accents of English. Cambridge University Press.
35. Westermann, D. (1930). A study of the Eʋe language (B. Smith, Trans.). Oxford University Press.

XIX. APPENDIX

Table A1. Realisations of /ɛ/, /e/ and /ə/ in Peki, Kpando and Aŋlɔ

Peki	Kpando	Aŋlɔ	Meaning
ɛvavam	evavam	əvavam	S/he is coming
ɛɖiku	eɖiku	əɖiku	S/he has slimmed down
ɛfu	efu	əfu	It is white
ɛɖiɖii	eɖiɖii	əɖiɖĩm	It is ripening
ɛflĩm	eflĩm	əflĩm	S/he cuts me into pieces

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