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Quantitative Analysis of Error Performance in the Production of Hausa Vowels among Yorùbá-Hausa L2 Learners in South-West, Nigeria

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ABSTRACT

This empirical study examined error performance in Hausa vowel production by Yorùbá speakers, using a quantitative approach. The aim was to compare two groups in the final-year National Certificate in Education in producing Hausa shared and unshared vowels, and to assess gender and institutional differences across five colleges (ABK, ACE, IKR, ORO, and ORO) to determine whether significant variation exists in the first and second syllables. A cross-sectional design was employed with 110 Yoruba-speaking participants aged 18 and above who were learning Hausa in the five colleges of education in southwestern Nigeria, selected purposively. Stimuli were drawn from the Online Hausa-English Dictionary, questionnaires were administered, and production tasks were audio-recorded. Data were analyzed with independent t-tests and ANOVA in line with Flege and Bohn's Revised Speech Learning Model (SLM-r). Results show that the t-test p-values are not significant in the first syllable (p > .482) and the second syllable (p > .051), while producing vowel length. When comparing the genders, the first syllable remained non-significant (p > .042). In contrast, the second syllable showed a significant difference between males and females (p < .004), indicating gender effects on vowel production in the second syllable. Across five schools, ANOVA yielded a highly significant overall difference (p = .000), with mean scores ranging from a low of 7.191 to a high of 23.58, suggesting variability in performance by institution. The study attributes such errors to linguistic, environmental, and L1 influence factors. The Hausa language teachers should focus on vowels with high error rates to improve second-language intelligibility.

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1. Introduction

Error Analysis (EA) is a field of Applied Linguistics that Stephen Pit Corder introduced during the 1960s as a replacement for Contrastive Analysis, especially to investigate what transpired

in second language acquisition. While Contrastive Analysis (CA) compares L1 and L2 to identify their similarities and dissimilarities, Error Analysis demonstrates that errors should be investigated to understand and improve the linguist's attempts at learning a second language. The standard practice of language use deviates when learners make mistakes that fall into the categories of syntactic, grammatical, lexical, morphological, or phonological errors. Accordingly, errors are categorized by assessing the gap between the learner's speech and reconstruction, and could be in the form of 'omission', 'addition', 'misinformation', and 'disordering'. Even though 'Error Analysis' serves three essential purposes which have to do with understanding, methodology structure in language teaching, as well as error correction, some errors were said to originate outside the native tongues of the learners. That language development depends on error analysis, which enables learners to construct their mental processes independently (Flege & Bohn, 2021).

Yorùbá native speakers encounter substantial difficulties in learning Hausa vowels due to language differences combined with tonal patterns and interference from the acquired language. With these, effective teaching strategies must be developed to help learners overcome their vowel and tone production issues, since seeing these challenges remains a priority. Hausa and Yorùbá languages share the following common vowels: [i], [e], [a], [o], and [u]. The two languages differ with Hausa having the phonemically long oral vowels such as [i:], [e:], [a:], [o:], [u:], and Yorùbá nasal vowels: [ĩ], [ɛ̃], [ã], [ɔ̃], [ũ] respectively. Learning Hausa by Yorùbá speakers across the five (5) colleges of education in the south-west, Nigeria appeared challenging, even though 2 (ACE & IKR) of the five Colleges have recently been upgraded from Colleges of Education to Universities of Education.

The National Policy on Education (NPE) (2004) encourages learning of a second language for educational, political, and socio-cultural developments in Nigeria. Hausa, Igbo, or Yorùbá are among the major languages that Nigerians are encouraged to acquire as a second language in schools under the language policy. This is to ensure fluency in Yoruba, Hausa, and Igbo, thereby promoting national unity and understanding among native speakers. Iwara in Maikanti (2021) notes that a significant portion of ethnic xenophobia and the fear of strangers from various regions of Nigeria would likely diminish once most Nigerians could converse with one another in their native languages. In addition to being taught and learned as a first language (L1) in northern Nigerian universities, Hausa, as one of Nigeria's major languages, is taught as an elective subject in junior secondary schools in the southwest and as a second language for the acquisition of the Nigeria Certificate in Education in some colleges of education. In this study, we have chosen to the following schools as the study location: Federal College of Education, Osiele-Abeokuta, Ogun State (referred to ABK), Adeyemi College of Education, Ondo, Ondo State (now Adeyemi Federal University of Education, Ondo) (referred to ACE), Ekiti State College of Education, Ikere-Ekiti, Ekiti State (now Bamidele University of Education, Ikere-Ekiti) (referred to IKR), and Kwara State College of Education, Oro, Kwara.

One of the significant distinctions in the pronunciation of words in a language is highly determined by how vowels are produced and tones are assigned differently in a language. This is because the production of vowels and assigning tones in language significantly influence pronunciation. (Ata, 2015; Ferragne & Pellegrino, 2010; Pillai et al., 2010). The persistent pronunciation challenges faced by Yorùbá learners of Hausa have significant educational implications. Mispronunciations can hinder effective communication and

comprehension, affecting learners' overall language proficiency. To address these issues, researchers should incorporate explicit pronunciation instruction into language curricula, emphasizing the contrasts between the Yorùbá and Hausa vowel systems, and employ auditory discrimination exercises to enhance learners' phonemic awareness. Learning Hausa by Yorùbá native speakers requires understanding basic rudiments, particularly vowels and tones.

It has been observed that despite the importance of learning additional languages for socio-economic and political reasons in our society, extant literature (Aghadiuno, 2021; Maikanti et al., 2021; Muhammad, 2021; Ata, 2015; Owolabi, 2014) focuses either on qualitative or mixed-mode (a combination of qualitative and quantitative methods). Studies on the quantitative approach to analyzing vowel production in Hausa receive less attention; hence, there is a need to fill this gap. The use of the Online Hausa Dictionary to generate data, especially from the Yoruba respondents, is another area that needs to be explored, and hence, the need to bridge this research gap to serve as a reference material. Studies comparing the performance of participants across institutions of higher learning, specifically on learning another language, such as the present study, serve as a novelty. It is against this background that the present study examines the error performance in the production of Hausa vowels among the Yorùbá speakers, using a quantitative approach to identify the vowels that were produced correctly and the vowels that were wrongly produced in disyllabic Hausa words.

At the end of the study, the non-intuitive Hausa speakers will benefit from the present research, especially in the area of learning additional languages for fluent and effective communication in society. Based on that, the present study intends to achieve the following research objectives:

1) To compare the performance of final year (NCE) students in the production of Hausa and Yorùbá shared and unshared vowels and see if there is a significant difference in their performance in the first and second syllables.
2) To find out if there is a significant difference between the performances of male and female participants in the production of Hausa vowels in the first and second syllables.
3) To determine the significant difference between the performances of participants from ABK, ACE, IKR, ORO, and ORO in the production of Hausa vowels in the first and second syllables.

2. Literature Review

Studies on Hausa vowel sounds remain elusive to native Yoruba speakers due to multiple linguistic and environmental obstacles that prevent the successful learning of Hausa as a second language for effective communication. Various research studies combining quantitative and qualitative methods through acoustic analysis (Biesta, 2010; Obakhavbaye, 2024) have confirmed that L2 learners fail to produce their intended vowels due to interference from either their native language or socio-linguistic factors, such as dialectal variation in the target language.

Various research studies evaluated numerical data regarding phonological mistakes that occur during vowel pronunciation by Yorùbá language native speakers as they learn Hausa. These investigations used qualitative and error analysis methods to evaluate student obstacles. Some learners struggled with a specific number of monophthongs, while others

excelled in their pronunciation of vowels. The data showed that the learners had trouble pronouncing the high front and low Hausa vowels, despite other phonological aspects being pronounced correctly. This demonstrates the dominance of native phonological patterns. Although there is literature on second language learning that focuses on mispronunciation, particularly among Yorùbá native speakers (Maikanti et al., 2021; Maikanti, 2021), more needs to be done to adequately address the issue of unintelligibility due to incorrect vowel pronunciation among Yorùbá learners of Hausa as a second language.

Bashir et al. (2023) examine substitution as an error in the pronunciation made by Igbo and Yorùbá speakers trying to learn Hausa. The research discovered that the many instances of long vowels in Yorùbá registered by others, especially with the aid of the concept of "basic word", concluded that Yorùbá could be said to have no long vowels in the phonemic sense; hence, learners would resort to substitution. The incorrect use of Hausa mid-short vowels /e:/ and /o:/ by L2 learners results in direct problems for word interpretation, together with grammatical errors in the language. The phonemic structure of mid-high extended vowels in the Yorùbá language causes learning difficulties among speakers who study Hausa. Yorùbá phonetics creates difficulties for accurate Hausa vowel pronunciation, which can be regarded as a persistent learning obstacle among the learners. The dissimilar vowel systems of Yorùbá with English make it likely that Yorùbá speakers will encounter similar hurdles in learning Hausa vowels because they have no equivalent sounds in their native language, especially the long and Hausa diphthongs (Maikanti, 2021).

As investigated by Gunn et al. (2024), this study reveals notable distinctions in vowel articulation and phonological features, such as the central articulation of /a/ in Urhobo versus its back articulation in Gokana, as well as the presence of vowel length contrast and nasalization in Urhobo, which is absent in Gokana. Nevertheless, both languages exhibit contrastive nasal vowels and allophonic nasalization. These findings are interpreted within the framework of the Revised Speech Learning Model (Flege & Bohn, 2021), offering insights into cross-linguistic vowel system variation and second-language vowel perception.

In a related development, Peter (2025) found that linguistics has been transformed by AI, which provides new ways to study, analyze, and support languages such as Yorùbá, a language with many different sounds. This research explains how AI aids in phonological research through the use of speech recognition, speech synthesis, and natural language processing. It emphasizes the benefits of forming collaborative data using linguists, technological experts, and native speakers for improved inclusion and more realistic cultural perspectives. Using AI in education, interactive tools help learn Yorùbá and ensure the tradition of the language is maintained. Ways to represent data ethically, consider culture, and provide equal opportunities are taken into account to promote responsible AI. As next steps, we should work on AI systems that cater to tonal languages, collaborate with specialists from various fields, and develop multilingual AI tools that bridge the language gap. It highlights that AI has the potential to preserve the Yorùbá language and others, thereby increasing the diversity of languages worldwide.

The research by Aghadiuno (2021) found that beginning to learn English early, becoming familiar with English culture, and having an English teacher from an early age significantly reduced challenges associated with using the mother tongue in English studies. Based on the results, the researcher recommended that seminars be organized for Chinese English

teachers, teachers allot more time to teaching spoken English, a reward-punishment system should be brought in to push for proper English usage in any learning situation, students should be prevented from communicating in their mother tongue at school and teachers should include sound classes more in their curriculum.

According to Princewill (2022), linguists are of the view that L1 is always in the minds of L2 speakers, which frequently encourages them to speak the target language with considerable L1 features. This is evident at various linguistic levels, including grammar, spelling, accent, and pronunciation. The goal of the current study is to empirically investigate Igbo dialectical subgroups in Anambra State that substitute the lateral /l/ sound with the trill sound /r/ and vice versa, using a qualitative approach. Thirty English words, both alone and in strings of words with /r/ and /l/ sounds, were extracted from the unstructured conversations of sixty respondents who were chosen at random for this study. All sixty participants were natives of Anambra State, belonging to the same dialectal subgroups, including Ozubulu, Ichi Awka, Ogbaru, Ihiala, Ojoto, Ajali, and Ekwulobia. Because these people could speak the same dialect, they were regarded as members of the same language family. The results reveal that some Igbo-English speakers automatically substituted /r/ for /l/ and vice versa, resulting in articulatory anomalies. For example, "Ame lica" for "America," "balacks" for "barracks," and "blown" for "brown." Oral speech ability has been regarded as less important to educational administrators than other areas of the English language. The study, therefore, suggested that schools should refocus more on developing understandable pronunciation when creating their English lesson plans.

Similarly, most research on Hausa phonology focuses on L1 phonology, with little attention paid to L2 phonology; hence, there is a need to expand the scope of the study to incorporate a different approach to the study of Hausa vowels produced by students from five different colleges of education who were learning Hausa. Even though there are many theories and models (e.g., Contrastive Analysis Hypothesis ; Error Analysis Model; Perceptual Assimilation Model for Second Language; and Revised Speech Learning Model that focus on second language learning, the postulation of Revised Speech Learning Model by Flege & Bohn (2021) which argues that second language learners have more problems with the sounds that are shared between the L1 and L2 than the unshared sounds appeared to the best theory suitable for the present study as it concerns learning a second language.

3. Research Methodology

3.1 Research Design

This study employed a cross-sectional design in analyzing error performance in the production of Hausa vowels among Yorùbá-Hausa L2 Learners at the NCE Level in South-Western Nigeria. With this type of design, primarily used in social science studies, a researcher measures both the outcome and the exposure of the participants simultaneously. Such a research design is aimed at investigating the prevalence of a phenomenon, such as a problem, attitude, or issue, by taking a cross-section of the population at one time to study. Almalki (2016) and Sileyew (2019) opine that this type of study design will enable the researcher to make in-depth explanations of the phenomena in second language learning.

3.2 Sampling Procedure and Sample Size

Participants in this study were selected using purposive sampling. It was only those who were native speakers of Yorùbá, especially those learning Hausa as a second language, and were willing to voluntarily participate in the study, who were allowed to participate. A total of 110 (males and females) participants aged 18 years and above in their final year (NCE 3) were chosen as participants after undergoing screening from the student population of 153 (one hundred and fifty-three) in the entire five schools. Choosing final-year students was based on the assumption that this group of students had acquired three years of training/ learning Hausa, enabling them to communicate to the extent of imparting knowledge to others. Out of those who participated (110) in the study, 60 were females, while 50 were males. This was to ensure gender balance in the study and to also ensure that every participant performed his/her task accordingly. Below is the breakdown of students from each school: Federal College of Education, Osiele-Abeokuta (ABK) has 29 participants, while Adeyemi College of Education, Ondo (ACE) has 25, and Ekiti State College of Education, Iker-Ekiti (IKR) has 20. Similarly, 23 students are from Kwara State College of Education, Oro (ORO), and 13 students were from Federal College of Education, (Special) Oyo (OYO).

3.3 Research Instrument and Data Collection Technique

10 different Hausa nouns with each containing the 12 Hausa vowels (short, long, & diphthongs), as appeared in the first and second syllables were prepared in word-matrix (see appendix page) for each of the participants to read aloud. At the same time, the researcher personally audio-recorded the speech production in just between 3 to 5 minutes. This is in addition to the use of a questionnaire, as the wordlists (stimuli) comprising target and non-target vowels were extracted from the Online Hausa-English Dictionary and prepared in a word matrix for the participants to read aloud. The researcher then made the recordings using a Sony IC recorder (ICD-SX2000). The wordlists were arranged in a word matrix to enable the participants to read them freely without knowing the specific items being examined by the researcher. With this, no need for them to make unnecessary adjustments or put extra effort when pronouncing the wordlists given to them to read. Enough time was allocated to each participant for the readings.

The production and recordings were conducted in language laboratories and staff offices, which were considered quiet and suitable for academic activities. This is in addition to the structured questionnaire already prepared to elicit more information from participants on how they can best identify the correct Hausa words among a mix of different words that have no meaning, even if their pronunciations are correct. Although all 110 participants initially could not speak Hausa, they were considered intact groups based on their enrollment in the Hausa program. As such, it could be somewhat challenging and somewhat unfair to assume they were all given equal treatment in their schools. To ensure that all the academic programmes and activities in the affected schools across the study areas were the same, all the Hausa L2 courses as contained in the Hausa L2 curriculum in line with the Nigeria Certificate in Education Minimum Standards for Languages (2020) were taught to the students learning Hausa as a second language.

3.3.1 Data Analysis Technique

The transcribed version of the production tasks was given to two language experts (linguists) from two different universities to assess the performance of each participant, and the scoring

format consisted of '0' and '1' marks. While '0' was awarded for every wrong pronunciation, '1' was awarded for the correct pronunciation. Any missing word(s) or those which could not be pronounced correctly were awarded '0' marks, and the total mean scores were used for the analysis to answer the research questions. To decide on the level of agreement between the two raters, an inter-rater reliability coefficient was computed across the two ratings according to items on each syllable using the Pearson Coefficient (*r*), Guilford's (2021).

4. Results

In this section, an attempt has been made to present and discuss the data analysis and research findings of the present study. Figures 1 to 4 and Tables 1 to 5 include information about Hausa vowels and the participants' performance, Figures 1 to 4 deal with the participants' errors and the production of first and second syllable Hausa vowels, whereas Tables 1 to 5 summarize the participants' results in producing Hausa vowels that are the same in both languages and those that are different, as well as male and female performance with paired sample t-test. This is in addition to Table 3, which contains information on the performance of participants from the five schools based on the production of Hausa vowels in the first and second syllables, using ANOVA. The performance of the participants can be illustrated below:

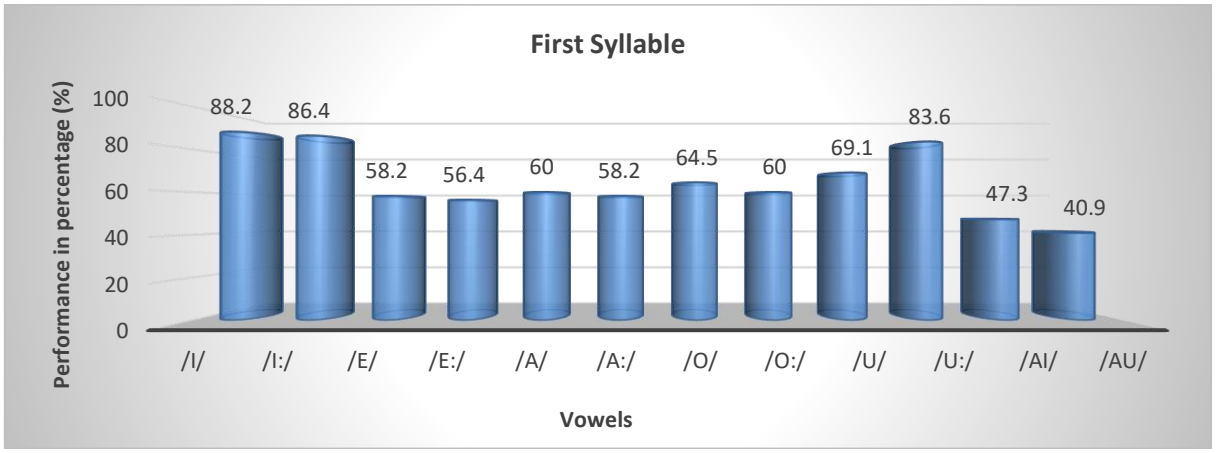

Figure 1. Error frequency on vowel production in the first syllable

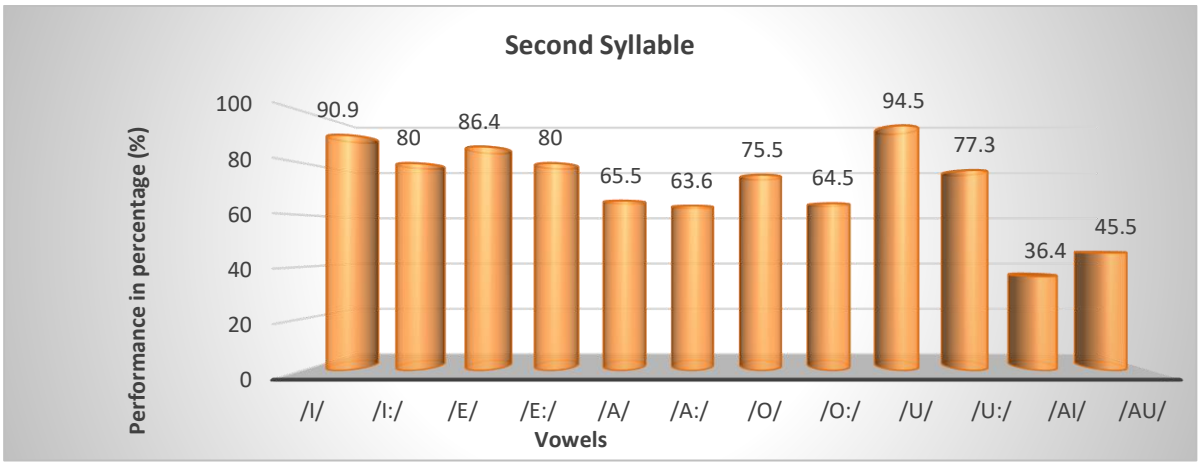

Figure 2. Error frequency on vowel production in the second syllable

Using the performance of the participants and evaluations made by two assessors, the researcher determined how well the scores aligned with Landis and Koch's (1977) agreement scale by conducting inter-rater reliability analysis. So, it was generally seen that /i/ used in the first syllable reached 88.2% and in the second syllable reached 90.9%, demonstrating excellent clarity. It is worth noting that the long front high vowel /i:/ in the first syllable received a score of 86.4%, which is only slightly different from the vowel in the second syllable, which received 80%. Both express strong performance. Even though the /e/ in the first syllable was only used 58.2% of the time, its use in the second syllable of words was much greater at 86.4%. There was a good score of 80% for the strong performance of the long mid vowel /e:/ in the second syllable, yet weak performance with 56.4% for the same vowel in the first syllable.

Also, the first occurrence of the short low central vowel /a/ got 60%, almost identical to the 65.5% scored by the same vowel later in the phrase, suggesting a normal performance. The score of 58.2% for the /a:/ vowel in the first syllable is considered poor performance, compared to 63.6% in the second, which is considered moderate performance. The same applies to the mid back vowel /o/, which occurred on the first syllable and scored 64.5%, and in the second syllable, it scored 75.5%, indicating they performed fairly well. The long mid back vowel /o:/ in the first syllable gets a score of 60% and a similar vowel is rated just slightly higher at 64.5% with a similar score. 69.1% appeared for the high back vowel /u/ in the first syllable, but 94.5% was found for the same vowel in the second syllable, which means almost perfect scores were given there.

The vowel /u:/ in the first syllable received an excellent result of 83.6%, but /u:/ occurring in the second syllable reached only 77.3%. The diphthongs /ai/ in the first syllable were performed with an accuracy of 47.3% which is not good, but the /ai/ in the second syllable were performed with an accuracy of 36.4% which is relatively poor as well. In addition, the same /au/ diphthongs in the first syllable were hard to pronounce, with 40.9% accuracy, opposite to the diphthongs in the second syllable, with 45.5%.

4.1 The Students' Performance in the Production of Hausa and Yorùbá

Statistical analysis is shown below to prove whether the performance of participants in vowel production differs for the shared and not shared (Hausa & Yorùbá) vowels in the first syllable.

Table 1. The students' performance based on shared and unshared vowels in the first syllable

Group	Mean	Std D	t-statistics (df)	p-value
Group 1 (Shared Vowels)	68.0	(12.05757)		
Group 2 (Unshared Vowels)	61.8	(17.18921)	9.997 (10)	.482

An independent sample t-test compared how frequently Hausa vowels were produced by Yorùbá native speakers during the first syllable, depending on whether those vowels were common to Yorùbá or not. Because Levene's test for equality of variances shows no significant difference (p=.378), both samples (groups) can be seen as having equal variance.

Research demonstrated that native speakers of Yorùbá did better in the first syllable on shared vowels (68.0), as opposed to unshared vowels (61.8), with p >.482. Since the p-value from the t-test is larger than 0.05, we decide to keep the original theory and decline the alternative one. Thus, it can be seen that participants make more errors on unshared vowels in the initial syllables, which is likely linked to the differences between the two languages.

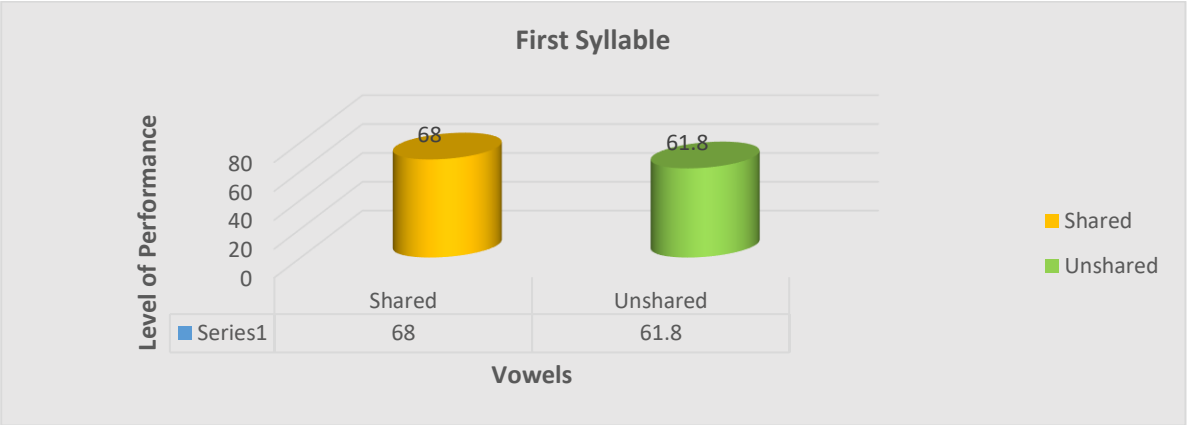

Figure 3. Production of shared and unshared vowels in the first syllable

Descriptive statistics were carried out to show the level of performance of the participants on the production based on the Hausa and Yorùbá shared and unshared vowels in the second syllable. This can be illustrated below:

Table 2. The students' performance based on shared and unshared vowels in the second syllable

Group	Mean	Std D	t-statistics (df)	p-value
Group 1 (Shared Vowels)	82.6	(11.91377)		
Group 2 (Unshared Vowels)	63.9	(17.28795)	10.000 (10)	.051

Comparing vowels of disyllabic Hausa words that were hard for Yorùbá native speakers in the second syllable was done using an independent sample t-test, using both similar and distinct vowels. Because the Levene's test result (p=.478) is non-significant, we assume that the variance between the two samples is the same. Yorùbá native speakers scored higher on syllable processing when the initial vowels were similar (M = 82.6) than when they were different (M = 63.9), t(10) = 10.000, p > .051. Because the p-value from the t-test is higher than 0.05, we stop supporting the alternative hypothesis and go with the null hypothesis. That is why non-identical Yorùbá vowels often seem difficult for them to produce in the second syllable of disyllabic Hausa words, but not as much in the first syllable.

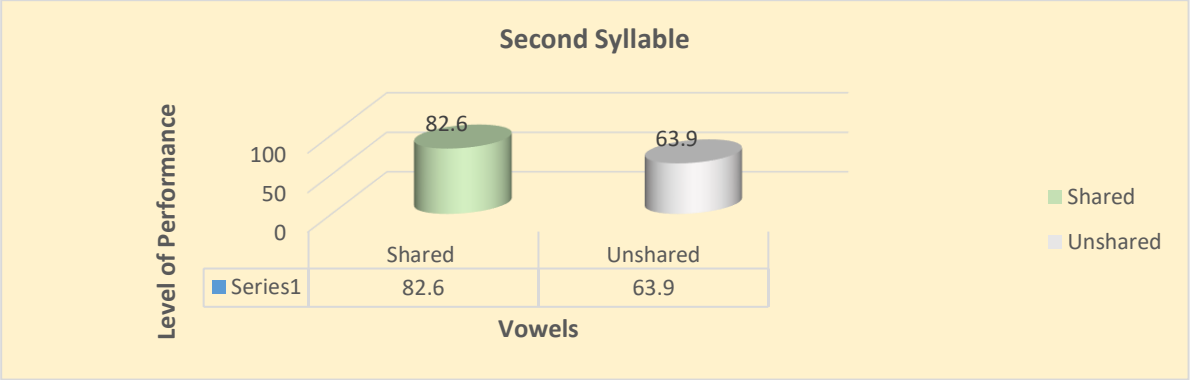

Figure 4. Production of shared and unshared vowels in the second syllable

4.2 The Performances of Male and Female Participants in the Production of Hausa Vowels

Descriptive statistics were carried out to determine if there is a significant difference in the performance of participants in the production of vowels between male and female participants, as illustrated below:

Table 3. Comparison of the two groups on vowel production in the first syllable

	Mean	Std D	t-statistics (df)	p-value
Group 1 (Males)	26.5	(12.61364)		
Group 2 (Females)	37.9	(13.20770)	21.954 (22)	.042

The analysis used an independent sample t-test to see how the Hausa vowels are produced differently by male and female Yorùbá speakers. Because Levene's test of variance equality gave a non-significant result (p=.831), we should consider that the variances in both samples (groups) are equal. Both male (M = 26.5) and female (M = 37.9) native speakers were tested, and the results showed that the female speakers answered the first syllable questions more accurately (t(22) =21.954, p >.042) than the males. Because the p-value for the t-test is greater than 0.05, we fail to reject the idea that the population means are different and accept the idea that they are the same. So, it is demonstrated here that male participants make more errors in the first syllable's vowels than the female participants.

Descriptive statistics were conducted to determine if a significant difference exists in the performance of participants on vowel production between male and female participants, as illustrated below shows the following results:

Table 4. Comparison of the two groups on vowel production in the second syllable

	Mean	Std D	t-statistics (df)	p-value
Group 1 (males)	28.4	(10.24664)		
Group 2 (females)	43.3	(12.43092)	21.227 (22)	.004

To look at the difference in Hausa vowel sounds in the second syllable, an independent sample t-test was done with male and female Yorùbá native speakers. Because Levene's test for variance shows that it is non-significant (p=.580), we conclude that the two samples have unequal variances. The findings indicate that male Yorùbá speakers did not do as well as female speakers in the second syllable (with Hausa vowels), t(22) = 21.227, p < .004. Rejecting the null hypothesis and accepting the alternative hypothesis is done here because the p-value is below 0.05. Hence, it is clear that male speakers make more errors in pronouncing vowels in Hausa than female speakers.

4.3 The Performances of Participants from ABK, ACE, IKR, ORO, and ORO

A one-way Analysis of Variance was applied to analyze and assess how 110 Yorùbá native speakers performed in five (5) different schools/ colleges, by focusing on twelve (12) types of Hausa vowels in the first and second syllables in disyllabic Hausa words. The Table below shows an example of how one-way analysis would work.

Table 5. The performances of participants in five schools on vowel production

Production of Hausa vowels by Yorùbá speakers according to schools											
	ABK		ACE		IKR		ORO		OYO		
Category	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	***p-value***
Syllable 1	21.60	4.01	20.17	4.83	8.008	4.95	7.191	3.17	7.433	2.62	.000
Syllable 2	23.58	5.16	21.74	5.88	8.941	2.86	8.033	2.90	9.383	3.23	.000

Based on the results of a one-way ANOVA, which was used to compare the production of Hausa vowels among participants, a clear difference was observed among the five groups (F(4, 55) = 39.88). Participants from ABK score better in producing vowels in the first syllable, with a mean score of 21.6 (SD = 4.01), than those from ACE (M = 20.2, SD = 4.83), IKR (M = 8.01, SD = 4.95), OYO (M = 7.43, SD = 2.62) and ORO (M = 7.19, SD = 3.17), showing they performed better through a Turkey. There was also statistical significance in how participants performed the second syllable test. Compared to those in IKR, ORO, ACE and OYO, those in ABK performed significantly better on vowel production (M = 23.6 and SD = 5.16), as the ACE group had an average of 21.7 and SD of 5.88, the OYO group had 9.38 and SD of 3.23, the IKR group had 8.94 and SD of 2.86. According to the statistical report, it is clear that individuals from ABK who scored the highest in both the first and second syllables exhibited better vowel production. In contrast, those from ORO who performed the lowest in both syllables appeared to make more errors in producing vowels.

4. Discussion

In line with the present research, the study on segmental description of four Nigerian English accents (Hausa, Igbo, Kanuri & Yorùbá), and accent classification experiments to assess the relative performance of four methods in classifying four Nigerian English accents conducted by Muhammad (2021) using a corpus of the four Nigerian English accents to collect data from 60 respondents (with each accent represented by 15 respondents) was successful with the use of analyses. Similarly, the accent classification task involved 118 participants drawn from three human groups - 80 Nigerian non-linguists (each L1 group represented by 20

respondents), 25 Nigerian linguists (6 Hausa, 9 Igbo, 5 Kanuri & 5 Yorùbá), and 13 UK-based phoneticians. The findings reveal that each of the four methods shows potential in accent recognition. However, overall results indicated that native speakers, regardless of linguistic background, were significantly more accurate in identifying speakers of their accent groups. The results also reveal that the UK-based phoneticians and Y-ACCDIST were the most accurate in identifying Yorùbá-English. Given that Yorùbá-English speakers exhibit stereotypes such as [h]-elision and [h]-epenthesis in their speech, it can be speculated that language analysis conducted by non-native speaker linguists may be more reliable if the language variety in question has such stereotypes.

Since the present study examined the production of Hausa vowel length and its interaction with syllable position, gender, and institutional differences among Yorùbá-speaking learners, the statistical results demonstrate that vowel production in the first syllable did not show significant differences ($p > .482$). In contrast, a near-significant trend was observed in the second syllable ($p > .051$). Importantly, gender comparison revealed a significant difference in the second syllable ($p < .004$), suggesting that male and female learners employ distinct articulatory strategies or perceptual cue weightings in the production of Hausa vowels. Furthermore, the analysis of variance across five schools yielded highly significant results ($p = .000$), with wide variations in mean performance scores (7.191–23.58). This indicates that institutional factors, such as teaching methods, exposure, and literacy support, may substantially mediate L2 vowel acquisition. These findings align with those of Johnson and Ezeani (2022), who emphasize that exposure to language education and literacy levels has a more substantial influence on L2 vowel production than mere phonetic similarity between L1 and L2 systems. Even the shared Hausa–Yorùbá vowels (/i/, /e/, /a/, /o/, and /u/) were frequently mispronounced, particularly when metalinguistic training was confined to articulatory phonetics, within the framework of the Speech Learning Model–revised (SLM-r), this outcome is not unexpected, because learners have to initially rely on perceptual categories derived from their L1 experience. Without sufficient exposure and corrective feedback, learners are more likely to map L2 vowels onto existing Yorùbá categories, leading to persistent non-target realizations even in acoustically similar contexts.

The results underscore the role of L1 allophonic variation in shaping L2 production outcomes. Yorùbá vowels are characterized by considerable allophonic diversity, which may lead Yorùbá-speaking learners to hyper-utilize a subset of phonetic cues when producing Hausa vowels. Consequently, mispronunciations arise not only from categorical differences but also from overreliance on L1 cue hierarchies. According to SLM-r, cue-weight recalibration requires repeated and consistent exposure to contrastive input in the target language, alongside explicit articulatory demands (e.g., height, backness, tenseness, and length). In the absence of such recalibration, learners default to entrenched L1 mappings, particularly in low-salience contexts where perceptual differences are less noticeable. Taken together, these findings suggest that successful acquisition of Hausa vowels by Yorùbá learners is not simply a matter of phonetic similarity, but instead of literacy-based exposure and the reorganization of perceptual cue weightings. The significant institutional differences observed in this study further highlight the importance of pedagogical strategies. Learners who are given more systematic metalinguistic training and repeated exposure to Hausa vowel contrasts are more likely to overcome L1 transfer effects. Conversely, when instruction is restricted to basic

articulatory descriptions without sufficient perceptual reinforcement, learners remain vulnerable to mispronunciations, even in shared vowel categories.

This study contributes to ongoing discussions in L2 phonology regarding the interface between perceptual categories, literacy, and exposure. It also provides empirical evidence that supports the SLM-r prediction of gradual perceptual space restructuring through input-driven recalibration. For Hausa–Yorùbá bilingual contexts, the findings highlight the pedagogical need for enhanced metalinguistic training that extends beyond articulatory awareness to encompass perceptual cue weighting and literacy-based reinforcement. Future research should explore longitudinal interventions to determine how sustained training may promote recalibration of vowel categories and reduce persistent L1 transfer effects. Aliening the outcome of the present study with Yakubu and Alabi (2023) demonstrated that syllabic stress patterns strongly influence vowel accuracy among Nigerian L2 learners of English and Hausa. In their study, the unstressed syllables were often centralized or reduced, weakening vowel quality. Similarly, the present results confirm that Hausa vowels in the second syllable remain especially vulnerable, reflecting the influence of syllable position on production accuracy. Within the framework of the Speech Learning Model–revised (SLM-r), this pattern is attributable to cue saliency: stressed or initial vowels receive greater perceptual and articulatory attention. In contrast, unstressed or less salient vowels are more prone to mispronunciation. Thus, Yorùbá-speaking learners appear to prioritize the first syllable, resulting in reduced accuracy in the second, where perceptual filtering and reliance on L1 mappings interfere with target production.

The findings align with Owolabi's (2014) study of Yorùbá speakers learning English vowels, which demonstrated that grapheme-phoneme mismatches and phonological transfer lead to persistent mispronunciation problems. Just as Yorùbá learners of English sometimes mispronounce vowels represented by /i/ and /o/ not due to lack of equivalence in the L1 inventory, Yorùbá learners of Hausa struggle with both shared and unshared vowels due to phonological mapping challenges. The Revised Speech Learning Model (SLM-r) provides a helpful framework for interpreting these results. According to Flege and Bohn (2021), learners rely on established L1 categories when perceiving L2 sounds, which can lead to interference when sounds overlap but are not identical. The present study confirms this prediction, showing that Yorùbá learners often map Hausa vowels onto Yorùbá equivalents, producing non-target realizations. Furthermore, the results align with SLM-r's claim that L2 categories lying outside the L1 phonetic set are particularly vulnerable to inaccurate production. The persistent errors on Yorùbá nasal vowels, which lack Hausa equivalents, support this mechanism. Similarly, the reduced accuracy of second-syllable vowels reflects the role of stress and syllabic environment in shaping cue salience; hence, learners attend more closely to stressed or initial syllables, while unstressed or medial vowels are more prone to reduction and misclassification.

This study shows that Hausa vowel acquisition by Yorùbá-speaking learners is influenced by syllable position, vowel type, and institutional context. The results affirm the predictions of the SLM-r, demonstrating that both shared and unshared vowels may be wrongly produced due to L1 transfer, perceptual filtering, and reduced cue salience in unstressed syllables. Pedagogically, the study emphasizes the importance of explicit phonetic instruction, integration of perception and production, and curricular standardization to enhance vowel accuracy. By addressing these areas, Hausa language education can more effectively support

learners in overcoming L1 interference and developing more accurate L2 phonological competence. The findings of this study demonstrate that vowel production by Yorùbá-speaking learners of Hausa is shaped by complex interactions between phonological similarity, syllable structure, and institutional context. Shared vowels (/i/, /e/, /a/, /o/, /u/) were not produced more accurately than unshared ones, confirming that phonetic overlap between L1 and L2 does not automatically guarantee accurate production. Instead, factors such as allophonic realizations, syllabic context, phonotactic constraints, and perceptual filtering influenced accuracy.

Moreover, unshared vowels, especially Yorùbá nasalized vowels ([ĩ], [ɛ̃], [ã], [ɔ̃], [ũ]), proved particularly problematic for Hausa learners, with errors observed across syllable positions. The finding that first-syllable vowels were more accurate than second-syllable vowels supports the view that prosodic prominence and articulatory effort are reduced in post-tonic syllables, making them more vulnerable to mispronunciation. These results echo the challenges reported in Al Abdely's (2021) study of Iraqi learners of English, who struggled with low vowels such as /ɒ/, /æ/, and /ʌ/. Just as the difficulties of Iraqi learners stemmed from the proximity of vowel categories in the English vowel space, Yorùbá learners of Hausa encounter challenges due to mismatches and overlaps between the two vowel systems. In both contexts, learners often assimilate L2 vowels into existing L1 categories, leading to accented pronunciation and reduced intelligibility. Notably, Al Abdely also demonstrated that proficiency level and degree of exposure mediated learners' accuracy, with advanced learners making fewer vowel errors than beginners. The present study confirms a similar principle, as learners with stronger institutional support (ABK) outperformed those from weaker instructional environments (ORO).

The Revised Speech Learning Model (SLM-r; Flege & Bohn, 2021) offers a coherent framework for interpreting these outcomes. According to the model, L2 learners classify incoming sounds using their L1 perceptual categories, which can either block or distort the acquisition of new L2 contrasts. This explains why Yorùbá-speaking learners mispronounce both shared and unshared Hausa vowels. While in the case of shared vowels, L1 categories are assumed to be equivalent, even when subtle phonetic differences exist, for the unshared vowels, therefore, learners lack suitable categories and approximate those using L1-based cues. The reduced accuracy in second-syllable contexts also aligns with SLM-r's emphasis on cue saliency, where learners allocate more perceptual and articulatory resources to stressed or initial syllables, thereby leaving unstressed syllables susceptible to reduction and misclassification. Furthermore, the comparative evidence from both this study and Al Abdely (2021) highlights that exposure and practice play a decisive role in reshaping L2 perceptual space. Learners in environments with greater opportunities for practice and feedback, whether Iraqi learners of English or Yorùbá learners of Hausa, demonstrate better pronunciation accuracy, underscoring the need for consistent, high-quality input to facilitate cue reweighting.

The present study extends the applicability of the SLM-r by showing that syllable position and stress interact with L1-L2 similarity to shape L2 phonological outcomes. While the model has primarily been applied to segmental contrasts, the findings therefore suggest that prosodic structure also affects how cues are weighted and reweighted in L2 learning. Moreover, the comparison with Al Abdely's (2021) work supports the SLM-r claim that exposure and proficiency level critically mediate the restructuring of perceptual space. By examining Hausa

vowel production among Yorùbá learners, this study provides empirical support for the SLM-r's prediction that both shared and unshared vowels pose challenges due to L1-based classification. The results further demonstrate that syllable position and instructional quality have a significant influence on accuracy. Pedagogically, the study highlights the importance of explicit phonetic training, perceptual exercises, and curriculum standardization. Theoretically, it emphasizes the need to consider prosodic context in L2 phonology research. Future studies could adopt longitudinal designs to trace how sustained perceptual and production training facilitates cue reweighting and improves vowel accuracy in Yorùbá-Hausa bilingual contexts.

The present study offers significant insights into the production of Hausa vowels by Yoruba learners of Hausa, situated within the Revised Speech Learning Model (SLM-r) of Flege and Bohn (2021). The statistical analyses revealed that vowel production accuracy was influenced by both syllable position and sociolinguistic variables, including gender and institutional background. Specifically, while first-syllable production did not reach significance ($p > .482$), second-syllable production approached significance ($p > .051$), suggesting that vowel articulation is more vulnerable in post-tonic contexts where articulatory effort is typically reduced. This finding aligns with prior observations in phonetic literature that post-tonic positions tend to attract reduced accuracy due to prosodic weakening. Gender-based analysis further revealed a significant difference in second-syllable production ($p < .004$), but not in the first syllable ($p > .042$), indicating that gender effects may be conditioned by prosodic salience. The institutional analysis yielded highly significant differences ($p = .000$), demonstrating that variation in exposure, pedagogical training, and literacy support across schools strongly affects vowel learning outcomes. These findings confirm the theoretical premise of SLM-r that L2 speech learning is not only determined by L1 transfer but also by the quality and quantity of L2 input, including educational contexts.

Comparative evidence from related studies enriches the interpretation of these findings. Ali (2013), in his study on Sudanese learners of English, found that errors in vowel production primarily arose from L1 interference and the absence of direct phonemic correspondences. Although Arabic-English learners benefited from some correspondences (e.g., lengthy vs. short vowels), difficulties persisted with English central and back vowels due to the absence of close equivalents in Arabic. The Hausa-Yoruba case in the present study exhibits a similar pattern, as learners incorrectly produced both shared and unshared vowels despite phonological overlap. This reinforces the view that mere structural similarity between languages does not guarantee successful acquisition, as perceptual filtering and cue-weighting from L1 still dominate. Olawe (2021) similarly demonstrated that Yorùbá-English bilinguals exhibited deviations in vowel realization due to mismatches in vowel inventories. Just as Yorùbá lacks equivalents for certain English vowels, Hausa learners faced challenges with Yorùbá nasalized vowels ([ĩ], [ɛ̃], [ã], [ɔ̃], [ũ]) not present in Hausa. Both studies highlight that phonological asymmetry between languages creates persistent learning barriers that are not easily overcome without targeted training. The fact that Yorùbá learners in the present study performed better in first-syllable contexts suggests that prosodic prominence may temporarily enhance vowel articulation, though this effect diminishes in subsequent syllables.

The findings of Akinjobi (2009) on Educated Yorùbá English (EYE) provide further theoretical support. His study demonstrated that Yorùbá speakers of English avoided syllabic

consonants by inserting strong vowels, thereby reshaping syllable structures in line with Yorùbá phonotactics. This finding parallels the Hausa-Yorùbá context in the present study, especially when learners cannot directly map L2 segments onto their L1 categories; they rely on repair strategies such as vowel insertion, substitution, or re-weighting of cues. The persistence of these strategies underscores the explanatory power of SLM-r, which posits that learners assimilate unfamiliar L2 sounds into the closest L1 category when perceptual distinctions are not sufficiently reinforced. Taken together, these results affirm three broader implications. First, shared vowels are not immune to mispronunciation, as the weight of allophonic variation and prosodic context can override structural similarities. Second, unshared vowels pose heightened challenges, and learners resort to approximations shaped by their L1 phonology, confirming the asymmetry observed in other bilingual contexts (Ali, 2013; Olawe, 2021). Third, pedagogical and institutional factors significantly mediate outcomes, meaning that targeted instruction in vowel discrimination and production could bridge the observed performance gaps. Theoretically, the study contributes to ongoing debates in second language phonology by demonstrating that vowel mispronunciation among Yorùbá learners of Hausa follows a predictable trajectory consistent with SLM-r: learners initially rely on L1-based categories. However, they can, with adequate exposure and literacy, gradually restructure their perceptual space toward L2 targets. Pedagogically, this underscores the need for explicit pronunciation training that emphasizes perceptual recalibration, prosodic awareness, and exposure to varied phonetic contexts. Without such interventions, learners may continue to rely on entrenched L1 strategies, particularly in low-salience syllabic positions.

Comparing the results of this study with those in Bello et al. (2020) on the intelligibility of vowels in Nigerian and Malaysian speakers provides valuable insights into the cross-linguistic interpretation of vowels and their production within the context of the Revised Speech Learning Model (SLM-r) (Flege & Bohn, 2021). We found that there was no statistically significant difference in the error rates in vowel length productions within the first syllable ($p > .482$) and marginal differences in the second syllable ($p > .051$). However, there was a gender effect on the second syllable ($p < .004$), indicating that segmental production was potentially affected by the socio-phonetic factors. It is the opposite of the case with Bello et al. (2020), where the problem was not on the supra-segmental level (length). However, it is within the segmental level and is especially strong when the vowel contrasts contain central vowels (e.g., /æ-ʌ/, /ɜ:-æ/, /ʌ-ɜ:/). In line with SLM-r, these results suggest that L2 learners perform worse when the salient contrasts are not consistent with their L1 phonological categories. Yorùbá learners can instead treat length distinctions perceptually as part of the existing L1 timing categories, and thus the low-need importance of errors. In the meantime, central vowels were more problematic in the Malaysian-Nigerian intelligibility test as they did not have clear L1 equivalents.

As the present study revealed, the results were also highly variable across institutions ($p = .000$), and the mean scores of the results differed primarily (7.191/23.58). This suggests that phonological success can be strongly influenced by local sociolinguistic and pedagogical contexts, which aligns with the SLM-r emphasis on subsequent plasticity and input-driven learning throughout the life course. Bello et al. (2020) nevertheless emphasized ethno-linguistic variation in a shared ESL environment: both Malay and Chinese ESL learners achieved comparable scores on high and mid-back vowels, but central vowels were a source

of challenges for both groups. That this challenge is pervasive among ethno-linguistic groups points to the possibility that the problem is not entirely a matter of different instructional approaches, but also of a structural mismatch between the vowels in question. Nigerian Hausa listeners in Bello et al. (2020) correctly identified the central vowels to Malaysian speakers (65 -71%), but they failed to differentiate between the vowels (/iː-ɪ/, /ʊ-uː/), which Malaysians produced. However, in our study, Yorùbá learners manifested no signal differences in first-syllable vowels in production but did generate gender-related asymmetries in second-syllable production. These findings reflect a production-perception mismatch within the SLM-r framework: unfamiliar acoustically distinct phonetic categories (/æ-ʌ/, /ɜː-æ/, /ʌ-ɜː/ for Malaysians) are challenging to perceive, whereas phonetically differentiated products (vowel length in Hausa by Yorùbá) may exhibit variable perception.

The SLM-r predicts that L2 speech acquisition is shaped by (i) the perceived relation between L1 and L2 categories, (ii) the quality and quantity of input, and (iii) the learner's ability to form new phonetic categories across the lifespan (Flege & Bohn, 2021). The two sets of findings reinforce these predictions in complementary ways. Yorùbá learners' performance indicates that vowel length, although perceptually assimilable, is variably implemented, depending on speaker-specific factors (such as gender) and institutional learning environments. Bello et al. (2020) illustrate, on the other hand, that when learners are faced with L2 categories that fall into an "equivalence classification trap" (i.e., assimilated to a single L1 category despite acoustic differences), intelligibility suffers significantly. Therefore, these findings suggest that L2 vowel learning challenges are not uniform but depend on the interaction of (a) L1-L2 phonological distance, (b) socio-phonetic factors such as gender, (c) the learning context, and (d) perception-production asymmetries. Pedagogically, this suggests that explicit teaching of central vowels (in Malaysian ESL students to Hausa) and vowel length contrasts (in Yorùbá learning Hausa) may serve to overcome gaps in those domains according to the SLM-r.

The findings of the current research are complex because they reveal patterns in the production of vowel length by Yorùbá-Hausa as L2 learners of Hausa. Statistical significance was lacking in the first syllable ($p > .482$) and second syllable ($p > .051$), nor was there a direction of evidence suggesting learners experienced difficulty generally in consistently correctly producing target vowel length, whether in the first syllable or the second. We found, however, that there was a substantial difference between the genders on the second syllable ($p < .004$), indicating that male and female learners took vowel production in different directions, perhaps because of a difference in speech strategies or exposure, or owing to sociolinguistic differences. Besides, the high between-institution variability (ANOVA: $p = .000$) demonstrates the importance of the school-specific pedagogical approach and contribution in making L2 learners perform phonetically. Similar patterns in notable and non-notable findings exist in companion studies in the fields of L2 pedagogy and applied linguistics. More specifically, Korkmaz (2021) has found that the beliefs and practices of Turkish EFL teachers toward their use of L2 knowledge in teaching showed statistically significant differences. Although the study by Korkmaz bases its findings on teacher cognition, rather than learner production, it is important to note that both studies share the idea that learners are individuals with contextual differences that greatly determine their L2 outputs. On the same note, Al Arif et al. (2023) in their mixed-method study of the ICT application in the learning of EFL also demonstrated the non-significance of the similarly measured score on student perception ($p > .03$). This is consistent with the non-significant

results of some dimensions (the first syllable vowel length, general gender differences) obtained in the current study and supports the idea that the outcomes of L2 learning can be non-random and defy general unification based on statistics.

Summarizing these results, they can be analyzed in the context of the Revised Speech Learning Model (SLM-r) suggested by Flege and Bohn (2021). Abidin (2008) suggests that the SLM-r foundation is limited by the necessity to define language-specific phonetic categories, as L2 learners cannot form new phonetic categories or change existing ones due to their available L1 categories, the quality of the input, and the level of cross-language mapping. The demonstrated significance of only a few vowel contexts in the current study suggests that it would be extremely challenging to establish a favorable new phonetic category of Hausa vowel length, as the SLM-r would predict that some L2 categories may be confused with similar L1 categories, leading to incomplete learning in that scenario. Since the gender effect is significant in the second syllable, this can be seen as a manifestation of the variation in the availability of input or strategy application in speech acquisition, as argued in the SLM-r. In addition, the high institutional variability (ANOVA values) also highlights the relevance of input quality and quantity, core principles in the SLM-r, as specific schools may offer more consistent models of Hausa vowel production compared to others. Consistent with SLM-r, the current study thus makes it clear that L2 acquisition of phonetics is neither homogenous nor deterministic. Instead, it is indicative of the interaction between cross-linguistic influence and input quality, as well as individual prominent variations in learners (e.g., gender), and instructional context (as suggested by institutional differences). Although in-part the findings support related research in the corresponding fields of L2 learning (Korkmaz, 2021; Al Arif et al., 2023), a distinct contribution of the study is the emphasis on how the reported dynamics occur in a phonetic aspect of vowel length, which tends to be highly prone to L1 transfer and invariance in the learning conditions.

These results are predictive within the framework of the Revised Speech Learning Model (SLM-r), developed by Flege and Bohn (2021). SLM-r reports that it is all about the way learners perceive the relations between the categories of L1 and L2, which determine the strings in L2. Where L2 sound is seen as similar to L1 sound (such as the case with identical vowels), the learners can associate the two and hence not create a separate phonetic category. This may be the reason why common vowels failed to give better accuracy in the present experiment. Conversely, in the case where L2 sounds are identified as unique (e.g., the Yorùbá nasalized vowels), learners find it difficult to create proper representations, as there is no pre-existing L1 phonological anchor. Thus high substitution rates will be observed. The SLM-r also anticipates that different input qualities and individual learner variations, as well as contextual factors, all points evident in the findings of this paper on syllabic position effects and institutional variability. Collectively, the current study and other literature in this field (e.g., Amiru & Rabiu, 2022) affirm that the acquisition of L2 vowels is neither a case of straightforward transfer nor one-on-one replacement, but one of interaction between input, category construction, and perception. The problems of both shared and unshared vowels illustrate the key point of the SLM-r that equivalence grouping of L2 sounds to L1 categories may hamper learning. In contrast, truly new sounds can only be acquired through strong perceptual learning and with input of adequate amounts to form categories. This has pedagogical overtones: specific instruction and training on vowel distinctions, especially in

syllable-final contexts and on unshared vowels, may be needed to circumvent deeply ingrained L1-based screening processes and contribute to successful L2 phonetic learning.

5. Conclusion

The present study found differences in vowels between Hausa and Yoruba. Yorùbá native speakers often struggle to pronounce the Hausa vowels in line with the Yorùbá vowel inventory. Studies have underlined in recent years that L1 phonology plays a key role in learning another language. The cross-linguistic variation observed aligns with the Revised Speech Learning Model, which posits that perceptual assimilation of non-native vowel categories depends on their acoustic similarity to native categories. The differences in vowel nasalization, length, and harmony underscore the uniqueness of each language's phonological system. In contrast, shared features such as nasal vowel contrast illustrate convergence typical within regional linguistic zones. While there are areas where the present research supports the prediction of SLM-r that second-language learners will experience difficulty in acquiring vowel distinctions that do not map directly onto their native inventory, there are also sections that did not concur with the assumption of the model (SLM-r), primarily as it affects the speakers of either language. Therefore, even though some issues remain unresolved regarding the investigation of error types, focusing on learner development, evaluating teaching strategies, and understanding the effects of language backgrounds could assist in identifying factors responsible for the challenges faced by learners. Investigating these gaps through research will enhance our understanding of learning Hausa as a second language and also inform the design of more effective language learning strategies. This study will therefore draw the attention of Hausa language curriculum designers and teachers/lecturers to focus more on areas where errors are most commonly committed, for better understanding. If not, it will continue to affect the intelligibility of the second language.

5.1 Recommendations

As further research is recommended to fully understand the implications of the present research findings for language teaching and learning using modern technology in a multilingual society, such as Nigeria, there is a need for language teachers to pay close attention to the areas of Hausa speech production. This is in addition to being engaged in training and retraining in language courses, particularly on issues related to second language (L2) pronunciation. Finally, the study calls for further investigation into advanced language learning patterns to uncover the second language acquisition patterns in multilingual environments, such as Nigeria. This will provide more valuable insights into the production of vowels generally among the learners of either a second or third language in Nigeria and beyond.

5.2 Limitations of the Study

This section centers on the production of Hausa vowels in the pronunciation of Yorùbá speakers learning Hausa. The research was limited to the production of Hausa and Yoruba shared and unshared vowels in disyllabic Hausa words, taking into account the performance of males and females, as well as the general performance of participants across selected higher educational institutions in the southwest, Nigeria.

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