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Acoustic Profiling of Central Vowels of Pakistani English: Describing the Nativised Variety

Research Article

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Abstract

English, as a global lingua franca, transcends linguistic and cultural boundaries and plays a pivotal role in connecting nations with diverse languages. The concept of World Englishes acknowledges the intricate tapestry of the English language across the globe. This research delves into the acoustic properties of central vowels in Pakistani English (PakE) with the objective of scrutinizing their distinctive features. Previous scholarly investigations (Bilal et al., 2011a; Sailaja, 2009; Kachru, 2005) have pointed to the absence of clear differentiation among central vowels (/ə/, /ɜ:/, and /ʌ/) in Asian varieties of English. This empirical study seeks to verify these findings. To gather data, a cohort of 40 participants (comprising 20 males and 20 females) was selected from the BS English program at the University of Mianwali, all of whom were native Punjabi speakers. Isolated words were recorded using a standard carrier phrase, and acoustic analysis was conducted utilizing Praat software to measure vowel formants, specifically F1 and F2. The obtained data were subjected to statistical analysis using SPSS. The findings of this study indicate that speakers of PakE do not consistently differentiate between /ə/ and /ɜ:/, while they do maintain a distinct pronunciation of /ʌ/ as a separate vowel sound. Consequently, PakE is characterized by the presence of two central vowels, substantiating its status as a distinctive nativized variety of English. This research sheds light on the evolving nature of English in diverse linguistic contexts, enriching our understanding of World Englishes and the variations within them.

Keywords: Pakistani English, Central Vowels, PRAAT, Vowel Formants

1. Introduction

English has established itself as a global lingua franca, facilitating cross-continental communication, notably across Asia. Although Asia boasts a multitude of native languages like Chinese, Urdu, and Hindi, English has transcended regional boundaries, thus giving rise to the concept of 'Asian Englishes.' These Asian English variations, prevalent in countries such as Pakistan, India, Malaysia, and Japan, find their place within the larger framework of 'World Englishes.' The term 'World Englishes' encompasses the rich tapestry of global English usage and can be viewed through multiple lenses. Bolton (2006) delineates three interpretations: as a comprehensive term encompassing all English variations, as a reference to emerging English varieties in Africa, Asia, and the Caribbean, and as an acknowledgment of a pluricentric approach to the study of English. Kachru (1985) classifies English varieties based on political and linguistic perspectives:

- The Inner Circle refers to the traditional cultural and linguistic bases of English.
- The Outer Circle represents the institutionalized non-native varieties (ESL) in regions with extended colonial histories.
- The Expanding Circle includes regions where English is primarily used as a foreign language (Kirkpatrick, 2007, p. 28).

In this context, the Inner Circle comprises countries where English is the native language, including the United Kingdom, the United States, Canada, and Australia. The Outer Circle consists of nations where English is used as a second language, such as Pakistan. Pakistan, a country recognizing Urdu as its national language alongside various regional languages, also designates English as an official language, employing it extensively for communication, particularly among the higher socio-economic segments. Lastly, the Expanding Circle pertains to regions where English is acquired as a foreign language, mainly for purposes like trade and travel. Mainland China serves as a prominent example of an expanding circle country.

In the postcolonial era in the subcontinent and Asia, there has been a remarkable proliferation of diverse forms of English. Diligent efforts have been made to showcase the emergence of distinct Asian English varieties. A notable example of these postcolonial English variations is PakE, a significant constituent of World Englishes. Following independence, English was officially adopted as a language in Pakistan, with a substantial portion of the Pakistani population using it for communication. Pakistan has rapidly embraced the English language, with a majority of its citizens incorporating it into their daily lives, positioning the country as the third-largest Asian nation in terms of English language usage (Bolton, 2006).

1.1 Objective of the Study

This study aims to establish that PakE, located within the outer circle of English varieties, deserves recognition as a thoroughly examined and academically acknowledged dialect of English. To substantiate this claim, the study conducts a comprehensive analysis with a specific focus on phonological variables, particularly the phenomenon of central vowels in PakE.

1.2 Research Questions

The study addresses the following key questions:

- How many central vowels are present in PakE?
- In what ways are these central vowels similar to or distinct from other varieties of English, particularly British English?
- Can PakE be classified as an indigenized variety of non-native English based on its central vowels?

2. Literature Review

Asian varieties of English exhibit distinctive linguistic characteristics that set them apart as native and individualized forms of the English language. A noteworthy area of differentiation lies in the realm of vowel sounds. While shared features are discernible, there are also variations in vowel articulation across these varieties. A recurring pattern is the absence of schwa and the blending of central vowels. Deterding (2005) has documented a prevalent tendency to avoid reduced vowels in English varieties spoken in South-East Asia, encompassing regions like Singapore, Brunei, other ASEAN nations, and China. This pattern is characterized by the indistinct differentiation between specific vowel sounds, such as /ʌ/ and /ə/, /a/ and /O/, and /ɛ/ and /æ/ in South-East Asian English (SAE). Moreover, it has been reported that Philippine English lacks the unstressed central vowel 'schwa' (Gonzalez & Alberca, 1978, as cited in Bautista & Gonzalez, 2006, p.134). Indian English, as noted by Kachru (2005), does not consistently distinguish between strong and weak vowels. Sailaja (2009) highlights the occasional neutralization of /ʌ/ and /ə/ in Standard Indian English Pronunciation. Furthermore, Mesthrie and Bhatt (2008) have identified six short vowels in PakE, with particular attention to the distinctive nature of the nurse /ɜ:/ vowel due to its rhotic quality.

A substantial body of scholarly work has explored various dimensions of PakE. Existing literature has shed light on distinct features characterizing PakE, such as its syllable-timed characteristics and the retention of a rhotic quality (Hickey, 2005; Mahboob & Ahmar, 2004). Given the phonotactic constraints stemming from Urdu, PakE has undergone resyllabification in many words, leading to the insertion of additional vowels (Mahboob & Ahmar, 2004). In their comprehensive analysis, Mesthrie and Bhatt (2008) have thoroughly documented the presence of six vowels in PakE, with an emphasis on the notable absence of /ɜ:/ in this variety (Mesthrie & Bhatt, 2008). Various scholarly contributions, including works by Baumgardener (1993), Kennedy (1993a, 1993b), and Tallat (2002, 2003), have delved into lexical borrowing from local languages, primarily Urdu, in PakE. Anwar (2007) and Tallat (2002) have observed instances of code-mixing and code-switching in PakE, reflecting the linguistic diversity of the region. Furthermore, Mahboob and Ahmar (2004) have brought to the forefront phonological disparities within PakE. Previous studies, such as those by Bilal et al. (2011b, 2011c, 2011d, 2021a, 2021b), Abbasi et al. (2018a, 2018b), Mahmood and Farooq (2017, 2018), Hasan and Imtiaz (2015), and Sheikh (2012), have examined the phonemes of PakE, elucidating differences in both pure vowels and diphthongs compared to Standard British English (SBE). Notably, Bilal et al. (2011a) reported the presence of only two central vowels in PakE, with the conspicuous absence of schwa /ə/, replaced by a full vowel /ʌ/. While prior researchers have explored various linguistic aspects of PakE, this study focuses specifically on the examination of central vowels in PakE.

3. Methodology

The present study delves into an acoustic analysis of the central vowels in PakE. It adopts a quantitative approach while being inherently descriptive. Below, the comprehensive methodology outlines how data was collected and analyzed.

3.1 Participants

The study's participants were sourced from the cohort of students enrolled in the BS English program at the University of Mianwali. In total, 40 participants took part, with an equal gender distribution. Their ages ranged from 22 to 26 years. An essential criterion for participant selection was their native fluency in Punjabi, alongside English proficiency for daily communication.

3.2 Word Selection

The study concentrated on monosyllabic words, with a focus on the /hVd/ context for all vowels, except schwa (/ə/), which was excluded from the analysis based on prior research indicating its non-existence in PakE (Bila et al, 2011a). This selection aligns with recommendations by Steven and House (1963, as cited in Roeder, 2009) and Wells (1962), emphasizing the /hVd/ context for its unique advantage in presenting vowel quality without the complicating influence of the consonant onset. This context is particularly effective in minimizing the impact on vowel formants and neutralizing any effects induced by the consonant onset, especially when /h/ is present (Hillenbrand, Clark & Nearey, 2001).

3.3 Data Collection Procedure

The chosen words were recorded using a carrier phrase, a deliberate choice to emulate a natural connected speech scenario for the vowels under scrutiny. Participants were instructed to articulate the words individually within this specified phrase, with room for appropriate pauses when required. Sufficient time was allocated for participants to practice, allowing them to become familiar with the pronunciation patterns of the words and articulate them according to their speech style. The dataset comprised a total of 80 vowel tokens, evenly distributed between male and female participants (40 for each group). To be precise, each vowel was represented by 40 tokens, with male and female participants contributing 20 tokens each. For determining the durational properties of each vowel token, manual measurements were meticulously conducted to identify the initial and final points of the vocalic nuclei, adhering to established measurement criteria (Peterson & Lehiste, 1960).

Words containing the specific vowels were extracted from the carrier phrase to enable a comprehensive analysis of vowel formants. Precise measurements of formant frequencies and vowel duration were carried out using PRAAT. Averages were computed to determine the formants and duration of articulation for each vowel. These vowels were then plotted within the vowel quadrangle, considering their formant frequencies, particularly F1 and F2. To evaluate the statistical significance of formant frequency differences, SPSS software was employed.

4. Analysis and Discussion

4.1 Male Speakers

In this section, we present a detailed analysis of male speakers' phonetic characteristics with a focus on the long central vowel /ɜ:/.

4.1.1 Long central vowel /ɜ:/ in Male Speakers

The analysis unveiled those male speakers articulated the long central vowel /ɜ:/ as a low vowel. This vowel demonstrated a slightly extended duration when compared to the other low-central vowel /ʌ/. It is noteworthy that this elongation in the duration of /ɜ:/ may be influenced by the subsequent /r/ sound, a common pronunciation pattern among PakE speakers, irrespective of its position within the syllable structure.

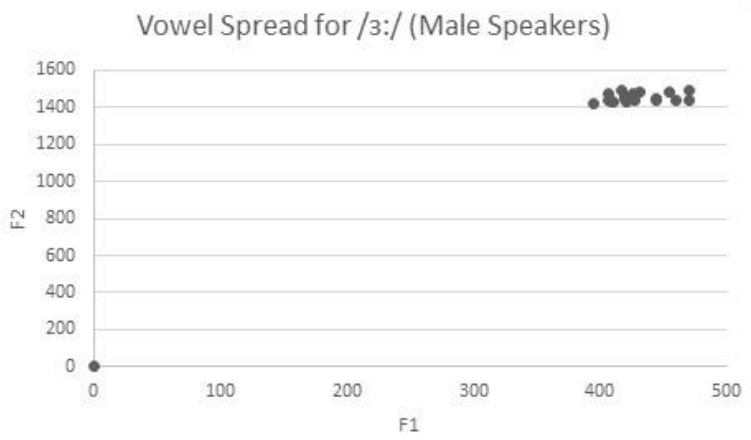
4.1.2 Duration of /ɜ:/ in Male Speakers

The average duration of the long central vowel /ɜ:/ in male speakers was 0.19 seconds. This duration was notably longer than that of the vowel /ʌ/, which lasted for 0.13 seconds. Comparing the duration of /ɜ:/ with other long vowels as pronounced by Punjabi speakers of PakE, it is evident that /ɜ:/ displays a significantly shorter duration.

4.1.3 Formant Frequencies for /ɜ:/ in Male Speakers

In terms of formant frequencies, the mean values for /ɜ:/ were 430Hz for F1 and 1460Hz for F2. The range for formants extended between 385Hz and 460Hz for F1 and between 1410Hz and 1485Hz for F2.

Figure 1. Scatter Plot for /ɜ:/ as articulated by Male Speakers



4.1.4 Statistical Analysis for /ɜ:/ in Male Speakers

Statistical analysis of formant frequencies and duration yielded noteworthy findings. The analysis revealed a significant and substantial difference in the mean values of formant frequencies for /ɜ:/

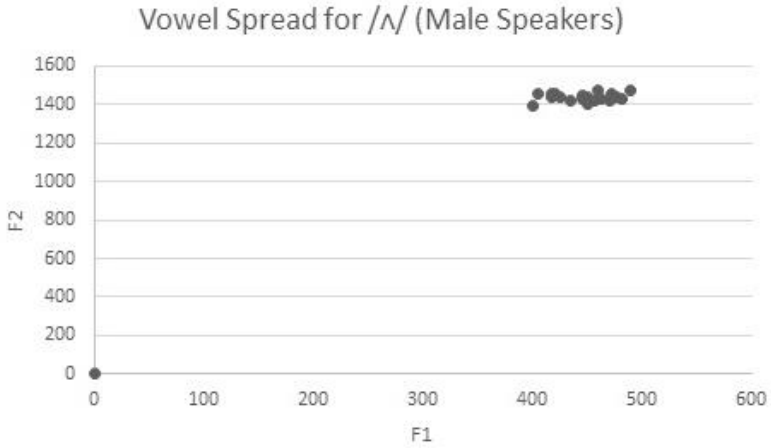
and /ʌ/. This difference was statistically significant at a level of $P < 0.05$. However, there was no substantial variance observed in formant values among individual male speakers, indicating a consistent articulation pattern across this group. Furthermore, the analysis affirmed a significant disparity in the mean durations of the two central vowels, establishing that /ɜ:/ is indeed articulated as a long vowel.

The results of this analysis underscore the distinct phonetic characteristics of the long central vowel /ɜ:/ in male speakers of PakE. It is evident that the specific phonetic features observed contribute to the unique phonological landscape of PakE.

4.1.5 Low central vowel /ʌ/

The male speakers exhibited uniform articulation patterns for the vowel /ʌ/. The vowel was pronounced as a short, low-central vowel in the context of Pakistani Punjabi English. The formant spread ranged from 410Hz (minimum) to 485Hz (maximum) for F1, and from 1385Hz (minimum) to 1460Hz (maximum) for F2. The mean value calculated for the first formant (F1) was 435Hz, and for the second formant (F2), it was 1430Hz. The average duration of articulation for the vowel /ʌ/ was approximately 0.13 seconds.

Figure 2. Scatter Plot for /ʌ/ as articulated by Male Speakers



The statistical analysis uncovered a notable distinction in the values of both formants, with statistical significance at $P < 0.05$. It is essential to highlight that the disparities in the values of both formants F1 and F2 were minimal, signifying a consistent pattern of vowel articulation across all speakers.

Below is a tabular representation of the average formant frequencies and duration of articulation for both vowels among male speakers of PakE.

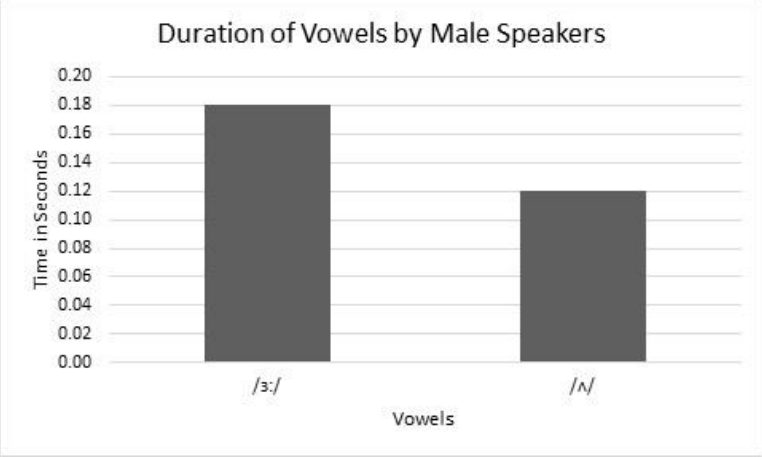
Table 1. Formant Frequencies and duration of /ɜ:/ and /ʌ/ as articulated by Male Speakers

Male Speakers			
Vowel	**F1 (Hz)**	**F2 (Hz)**	**Time (in secs)**
/ɜ:/	430	1460	0.19
/ʌ/	435	1430	0.13

These values reflect the phonetic characteristics of the male speakers' articulation of the central vowels /ɜ:/ and /ʌ/ in PakE. The small differences in formant frequencies suggest a consistent articulatory pattern among male speakers, while the longer duration of /ɜ:/ confirms its status as a long vowel in the phonological landscape of PakE.

The articulation of the two central vowels by male speakers of Punjabi English indicates that while they distinguish between the two vowels as long and short, both are articulated as low central vowels. Particularly, the vowel /ɜ:/ displayed distinct characteristics compared to its counterpart in British English; Pakistani male speakers articulated it as a low vowel. The main difference between the two central vowels was observed in their duration of articulation. The following graphical representation provides a comparative analysis of the duration of the two vowels.

Figure 3. Graphical Display of Duration of Vowels as Articulated by Male Speakers



4.2 Female Speakers

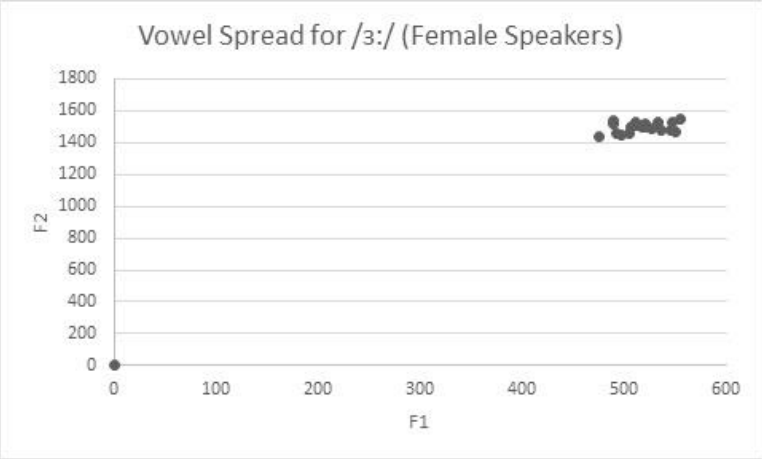
The analysis of female speakers reveals that they exhibit similar patterns to their male counterparts.

4.2.1 Long central vowel /ɜ:/

Consistent with the male speakers, female speakers articulated this vowel as a central sound. However, two notable distinctions from native English varieties were observed. Pakistani female speakers pronounced it as a relatively short vowel compared to British English. Furthermore, it was articulated as a mid-open central vowel, with the lips in a neutral position (neither spread nor rounded). The average duration of articulation for this vowel was 0.21 seconds. The formant frequencies for F1 ranged from a minimum of 465Hz to a maximum of 560Hz, while for F2, the

range was from 1430Hz to 1540Hz. The mean formant frequencies were calculated as 515Hz for F1 and 1505Hz for F2.

Figure 4. Scatter Plot for /ɜ:/ as articulated by Female Speakers

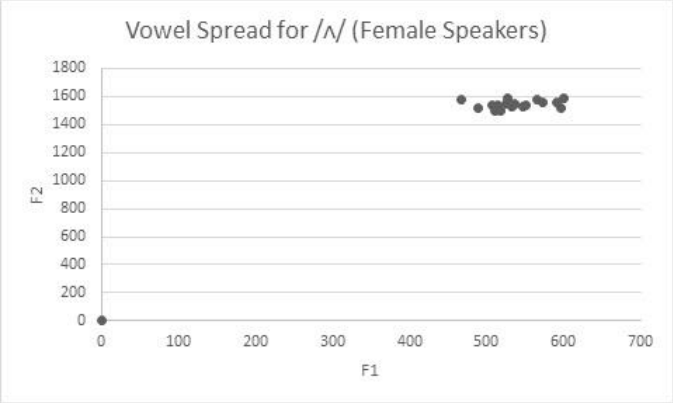


The statistical analysis demonstrated a significant distinction in the mean values of the two formants, reaching statistical significance at $P < 0.05$. However, it is noteworthy that the differences in the values of both formants F1 and F2 were negligible, indicating a consistent pattern of vowel articulation across all speakers. Furthermore, the analysis revealed a significant difference in the mean durations of the two central vowels, affirming that /ɜ:/ is a long vowel.

4.2.2 Low central vowel /ʌ/

Female speakers exhibited an articulation pattern for this central vowel consistent with British English, realizing it as a short low-central vowel. In comparison to /ɜ:/, it was observed that /ʌ/ was articulated with a slightly lower tongue position and had a shorter duration. The lips remained unspread and unrounded during the articulation of this vowel. The formant frequencies ranged between 500Hz (minimum) and 590Hz (maximum) for F1 and between 1490Hz (minimum) and 1585Hz (maximum) for F2. The calculated mean values for the first formant (F1) and the second formant (F2) were 525Hz and 1530Hz, respectively. The average duration of articulation for the vowel /ʌ/ was 0.13 seconds.

Figure 5. Scatter Plot for /ʌ/ as articulated by Femsale Speakers



The statistical analysis revealed a significant distinction in the values of the two formants, reaching statistical significance at $P < 0.05$. However, it is noteworthy that the differences in the values of both formants F1 and F2 were negligible, indicating a consistent pattern of vowel articulation across all speakers.

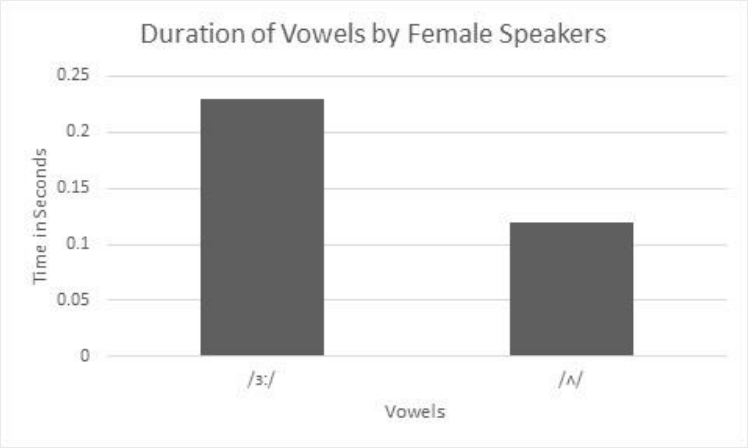
Here are the average values of F1 and F2 as characterized by female speakers, along with the duration of articulation for both vowels in tabular form.

Table 2. Formant Frequencies and duration of /ɜ:/ and /ʌ/ as articulated by Female Speakers

Female Speakers			
Vowel	**F1 (Hz)**	**F2 (Hz)**	**Time (in secs)**
/ɜ:/	515	1505	0.21
/ʌ/	525	1530	0.13

The pattern of female speakers in articulating the two central vowels demonstrates that while they made a clear differentiation in terms of length, both vowels were pronounced as low central vowels. It is noteworthy that the vowel /ɜ:/ displayed a distinctive feature when compared to its British English counterpart; Pakistani female speakers pronounced it as a low vowel. The primary distinction between the two central vowels lay in the duration of their articulation. The following graphical representation elucidates a comparative analysis of the duration of these two vowels.

Figure 6. Graphical Display of Duration of Vowels as Articulated by Female Speakers



4.2.3 Comparison of Male and Female Speakers

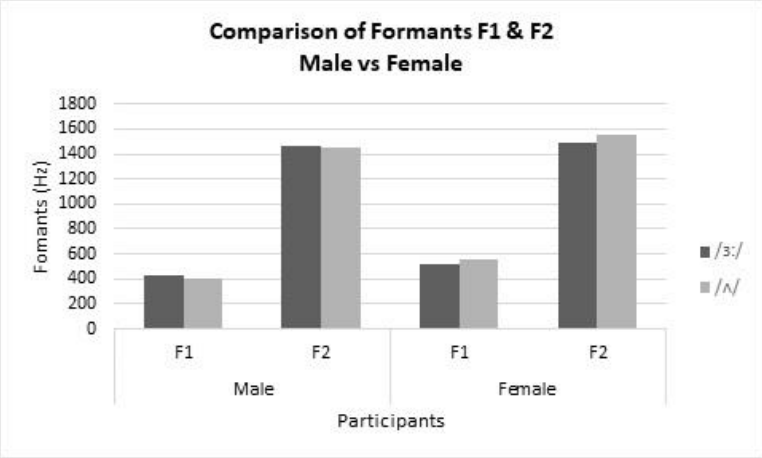
The analysis of formants and duration of articulation for the central vowels /ɜ:/ and /ʌ/ revealed a consistent articulation pattern among male and female speakers. The figure provided below presents formant values for both male and female speakers, indicating a comparable articulation of both vowels in terms of their articulation position.

Table 3. Comparison of Formant Frequencies of /ɜ:/ and /ʌ/

Male vs Female Speakers				
Vowel	**Male**		**Female**	
	F1	F2	F1	F2
/ɜ:/	430	1460	515	1505
/ʌ/	435	1430	525	1530

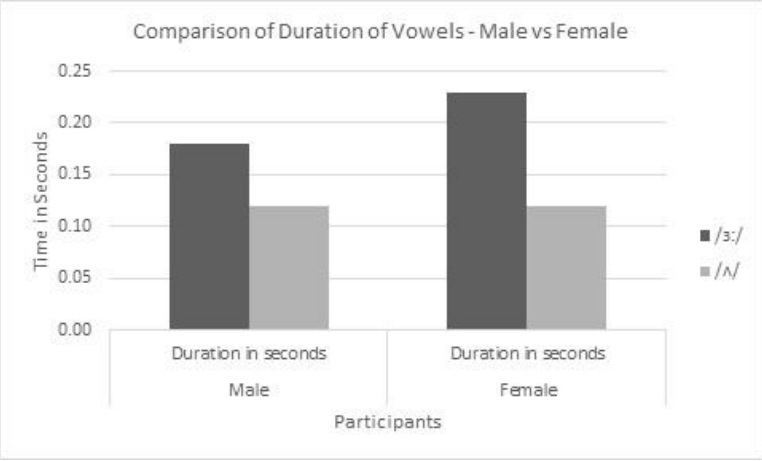
The figure below offers a clear insight into how male and female speakers articulate the central vowels. While there is minimal discrepancy in the formant frequencies of these vowels, their pronunciation closely aligns. The visual representation clearly portrays that both vowels are pronounced in a similar position, categorizing them as low central vowels.

Figure 7. Graphical Display of Duration of Vowels as Articulated by Female Speakers



The analysis of the duration of articulation highlights a distinction in the length of the vowels /ɜ:/ and /ʌ/. While /ɜ:/ is enunciated as a long vowel, /ʌ/ is pronounced as a short vowel. Furthermore, in contrast to the mid-central vowel typical in British English, PakE speakers articulate /ʌ/ as a low central vowel. Both formants and duration demonstrate a consistent pattern of articulation for central vowels across both male and female speakers.

Figure 8. Comparison of Duration of Vowels as Articulated by Male and Female Speakers



5. Conclusion

In order to establish whether PakE qualifies as a distinct linguistic variety, it is essential to consider the linguistic factors contributing to variation in a specific variety. Distinctive varieties are often discerned by factors such as the number of phonemes or the articulation patterns of those phonemes in speech (Barber et al., 2009; Cruttenden, 2008; Bauer, 2002). This study has centered its attention on the central vowels of PakE and their patterns of articulation. The findings reveal a unique articulation pattern in PakE, setting it apart from other forms of English.

The idiosyncrasies observed in the pronunciation of central vowels in PakE suggest that it can be classified as a distinct variant among non-native Asian Englishes. The phonological distinctions identified in this study indicate that PakE possesses its own set of phonemes and articulation patterns, particularly in the context of central vowels. Therefore, it can be reasonably concluded that PakE represents a unique variety of English characterized by two central vowels, in contrast to Standard British English (SBE), which includes three central vowels. This underscores the intricate diversity and nuances present in English language varieties across different regions and linguistic communities.

It is important to note that the conclusions drawn in this research are based on a meticulously analyzed yet limited dataset, constrained in both scope and linguistic context. Thus, generalizing these findings should be approached with caution, as they are specifically applicable to the instances of PakE examined in this study and the particular linguistic context. Despite these limitations, this study holds significant scholarly value as an initial step, providing a foundational framework for language scholars interested in exploring the intricacies of PakE. It serves as a launching pad for comprehensive investigations across various linguistic dimensions within PakE, including phonology, lexicology, morphology, syntax, and related aspects. Such extensive inquiries will offer nuanced insights into the linguistic nuances and variations unique to PakE within its specific linguistic context. In essence, while the findings are tailored to the dataset and context under examination, they establish a crucial starting point for future research, enabling a deeper exploration of the linguistic attributes that characterize this particular variant of English.

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Bio-note:

Hafiz Ahmad Bilal is doing his PhD in English from University of Sargodha. He is a serving Professor of English in Higher Education Department. His research interests include Phonology of PakE and Critical Discourse Analysis. He has presented his research findings at several international forums, namely IAWE Conference (Melbourne), ASFLA Conference (Sydney), UPALS Conference (Malaysia).

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