



Monophthongs of PakE: An acoustic investigation

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Abstract- Pakistan falls into the outer-circle countries where English is used as second language. The indigenization process has caused much variation in spoken as well as written English. It is observed that a new variety of non-native Englishes is in the making, i.e. Pakistani English (PakE). The current study looks into this observation through acoustic analysis of the vowels of PakE, to determine whether PakE can be claimed as an indigenous variety of Asian Englishes on the basis of its monophthongs. The study examined the monophthongs of PakE. For the analysis, 30 participants (15 male and 15 female) were chosen from among the students of MPhil English University of Sargodha Pakistan, who were working on their dissertations after completing their course work. It was also considered that all of them were aged from 22 to 26, were using Urdu as their mother tongue, and were exposed to English since their primary schooling. Monosyllabic words with /hVd/ context were selected and recorded using a carrier phrase in a noise free environment with the help of hi-tech equipment. For the measurement of formants, i.e. F1 and F2, and the durational properties, PRAAT was used. Tukey's HSD Test was also performed to examine whether the values of formants are significantly different. The results proved that PakE has nine pure vowels (unlike SBE which has twelve). On the basis of the results, the conclusions were drawn that PakE is a different variety of non-native English with its distinct set of vowel phonemes.

Key words: Asian Englishes, PakE, monophthongs acoustic measurement, formants, PRAAT

I. INTRODUCTION

Language is part and parcel of any culture, and history reveals that it is the culture of the rulers and of those who hold power that sustains itself and dominates the culture of the weak (Tobin, 2020). The last two centuries have seen the dominance of English speaking nations i.e. the British Empire and the USA. With the dominance of these two countries politically, scientifically, academically, etc. the weak and the colonized nations were left with no choice but to put efforts to learn English (Tomlinson, 2001). Pakistan is no excuse, as it has been part of the region which has been colonized by the British Empire for almost a century. Though it won its freedom in 1947 from the British rule, yet it cannot resist against the overwhelming power of the English language.

English has the status of official language in Pakistan, though the constitution of 1973 declares Urdu to replace English as official language within a decade, yet no visible progress has been observed in this regard (Ali, 2013). English is considered the language of prestige, and the young students are aspirant to learn it as it is believed that English paves way to success. It is the language of the academics. Most of the competitive exams and follow-up interviews take place in English. Though the elite still tries to follow the British accent, yet PakE has gone through several phases of evolution over the last 74 years. According to many language researchers, PakE is in the making (Baumgardener, 1993; Tallat, 2002, 2003). Hence, the current study is an attempt to investigate the phonological features of PakE to find out on scientific grounds whether it is a unique and distinct variety of English.

II. LITERATURE REVIEW

Many research attempts have been made on various aspects of PakE. It is reported that PakE is a syllable-timed and rhotic variety of English (Hickey, 2005; Mahboob & Ahmar, 2004). Owing to phonotactic constraints of Urdu, PakE has resyllabified many words by inserting vowels (Mahboob, 2004). Mesthrie and Bhatt (2008) reported six vowels in PakE. They further reported the absence of /ɜ:/ in PakE (Mesthrie & Bhatt, 2008). Baumgardener (1993), Kennedy (1993a, 1993b) and Tallat (2002, 2003) reported lexical borrowing from local languages especially Urdu. Anwar (2007) and Tallat (2002) observed that code-mixing and code-switching often takes place in PakE. Mahboob and Ahmar (2004) reported phonological differences in PakE. Studies on vowel phonemes of PakE have been reported by Bilal, et al ((2011a, 2011b, 2011c, 2011d, 2021a, 2021b), Abbasi et al (2018a, 2018b), Mahmood and Farooq (2017, 2018), Hasan and

Imtiaz (2015) and Sheikh (2012). In all these studies, differences in pure vowels and diphthongs have been reported as compared to SBE. The previous researchers focused on different aspects of the linguistic features of PakE. The current study is unique in the sense that it investigates all the pure vowels of PakE.

Research Objectives

The study is an acoustic investigation of the pure vowels of PakE with the following objectives:

- To investigate the number of pure vowels of PakE
- To conclude whether PakE is a different variety of non-native English

Research Questions

The study is focused to find answers of the following particular questions.

- How many pure vowels are there in PakE?
- Can PakE be declared as distinct variety of English on the basis of the features of its pure vowels?

III. METHODOLOGY

Participants

After a rigorous and meticulous process of selection, the participants were chosen from among the students of MPhil English, University of Sargodha who did complete their course-work and were now working on their dissertations. They were interviewed before selection to determine the few variables including age (between 22-26 years), exposure to English (from their primary schooling), mother tongue (Urdu) and fluency. The objective was to collect a homogenous data to reach adequate conclusions.

Word List

Monosyllabic words with /hVd/ context were selected for all vowels except for schwa /ə/. According to Steven and House (1963, as cited in Roeder, 2009), the major benefit of the /hVd/ context is that it provides vowel quality without any influence of the consonant on the onset, which affects the formants of the vowels, and which is neutralised in case of /h/ on the onset (Hillenbrand, Clark & Nearey, 2001). Wells (1962) also favours the use of /hVd/ context for the analysis of English vowels.

Procedure

The words were recorded using carrier phrase 'would you say _____ in a loud voice'. The carrier phrase was used to give the vowels an outlook of natural connected speech. Each participant was asked to speak each word separately in the said phrase giving certain pause. The participants were given time to practice and learn the pronunciation pattern of the words and then to articulate them in their style. The total vowel tokens were 360 (180 for males and 180 for females). For each vowel, the tokens were 30 including 15 male tokens and 15 female tokens. To calculate the time duration of each vowel token, the initial and final point of vocalic nuclei were considered and were measured manually using standard measurement criteria (Peterson and Lehiste, 1960).

Words containing the required vowels were isolated from the carrier phrase for further analysis of vowel formants. For the measurement of formant frequencies and the duration of the vowels, PRAAT was used. Averages were calculated for the formants and the duration of articulation of each vowel. Finally, the vowels were placed in the vowel quadrangle according to their formant frequencies, i.e. F1 and F2. For statistical analysis, Tukey's HSD Test was performed to observe whether the difference in formant frequencies was significant or not.

IV. ANALYSIS AND DISCUSSION

The formant frequencies of male speakers and female speakers are different due to differences in vocal apparatus, i.e. the size of the oral cavities etc. So to get adequate results, separate analysis was conducted for male and female speakers. The analysis of the sounds of male speakers is given below.

Male Speakers

Male speakers of PakE came out with certain idiosyncratic features of the vowel articulation, though some similarities with the vowel pattern of BSE were also recorded. Male speakers of PakE articulated different number

Front Vowels

Male speakers articulated four front vowels i.e. /i:/, /i/, /e/ and /æ/. The pattern of articulation was like that of Standard British English (SBE). The speakers clearly distinguished between high front vowels /i:/ and /i/ as long and short vowel respectively. The difference in the formant frequencies and the vowel duration exhibited that the two were pronounced as two distinct phonemes. The mean F1 for /i:/ and /i/ were 400Hz and 470Hz, and F2 were 2300Hz and 2150Hz respectively. The average duration of the two vowels remained 0.17 seconds for /i:/ and 0.05 seconds for /i/. The vowel /e/ was realised as mid front vowel (with F1 600Hz and F2 2100Hz) and the vowel /æ/ as low front vowel (with F1 730Hz and F2 2140Hz). The duration of articulation remained 0.04 seconds for /e/ and 0.07 seconds for /æ/. The low front vowel /æ/ was articulated a bit longish as compared to /e/. Yet both were realised as short vowels. The statistical analysis showed that the difference among the formant frequencies of all the vowels was significant, confirming that all the vowels were pronounced in a distinct manner. The average formant frequencies and the average duration of the vowels are displayed in the following table.

Male speakers			
Vowels	F1 (Hz)	F2 (Hz)	Duration (sec)
i:	400	2300	0.17
I	470	2150	0.05
e	600	2100	0.04
æ	730	2140	0.07

Figure 1

Following (Figure 2) is the graphic display of the duration of the four front vowels, i.e. /i:/, /i/, /e/, and /æ/, as exhibited by the male speakers of PakE. The graph clearly indicates that the speakers distinguished between the long and the short vowels. PakE speakers showed variation in the articulation of short vowels when it comes to duration, i.e. the vowels /i/ and /e/ took almost same time for their realisation but the vowel /æ/ took relatively greater time as compared to /i/ and /e/. So, it can be said that as far as front vowels are concerned, PakE followed the pattern of SBE and there was no significant difference between the two varieties.

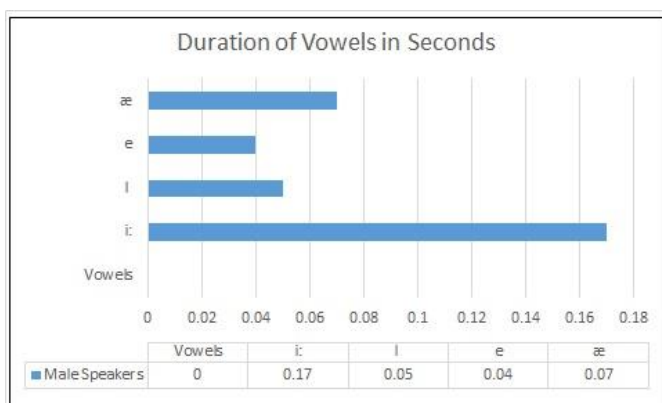


Figure 2

Central Vowels

PakE speakers came up with a different behaviour as far as central vowels are concerned. It was observed that the reduced vowel, i.e. /ə/ had been articulated as a full vowel. In other words it may be said that PakE speakers did not articulate /ə/ vowel. The same phenomenon was observed for the long central vowel, i.e. /ɜ:/. It was articulated as a short vowel, and that too not as mid-centre but as low-centre vowel. The formant frequencies of the three central vowels, i.e. /ʌ/, /ə/ and /ɜ:/ did not show any significant difference. The first formant (F1) remained 650Hz, 630Hz and 650Hz for /ə/, /ɜ:/ and /ʌ/, and the second formant (F2) remained 1400Hz, 1450Hz, and 1430Hz for /ə/, /ɜ:/ and /ʌ/ respectively. HSD Tukey's statistical test proved that the difference in formant frequencies was insignificant. As far as the duration of the vowels is concerned, no vowel was articulated as long vowel. The average duration of articulation remained 0.049 seconds, 0.052 seconds, and 0.047 seconds for /ə/, /ɜ:/ and /ʌ/ respectively.

On the basis of the analysis, it can be said that PakE speakers articulated only a single central vowel, and that too as low-central vowel. The following table (Figure 3) presents the mean formant values (F1 and F2) of the central vowels, and their average duration of articulation as articulated by PakE male speakers. Statistical analysis ascertained that the difference among the durational properties of the three vowels is insignificant, i.e. all the vowels are articulated in almost same amount of time.

Male speakers			
Vowels	F1 (Hz)	F2 (Hz)	Duration (sec)
ə	650	1400	0.049
ɜ:	630	1450	0.052
ʌ	650	1430	0.047

Figure 3

Below (Figure 4) displays the graphic presentation of the duration of the three central vowels as articulated by male speakers of PakE. The graph suggests that all are short vowels, though the vowel /ɜ:/ took a slightly longer duration, yet that difference is statistically proven insignificant.

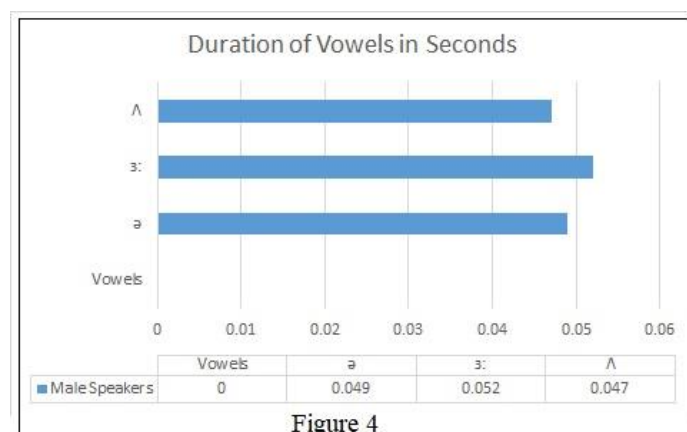


Figure 4

Back Vowels

The analysis of the back vowels i.e. /ɑ:/, /ɒ/, /ɔ:/, /u/, and /u:/ also showed some variation in the articulation as compared to SBE. The F1 of the five back vowels was 750Hz, 620Hz, 600Hz, 390Hz, and 340Hz and F2 was 1150Hz, 1080Hz, 1050Hz, 1070Hz, and 1050Hz for /ɑ:/, /ɒ/, /ɔ:/, /u/, and /u:/ respectively. PakE speakers did distinguish among /ɑ:/, /u/ and /u:/ and realised them as low back long vowel, i.e. /ɑ:/, and short and long high back vowels, i.e. /u/ and /u:/ respectively. The formant frequencies and the durational properties of these three vowels ascertained that they were articulated as distinct vowel phonemes. The statistical analysis also proved that the difference among the formant frequencies of these vowels and their durational properties was significant. But the low back short vowel, i.e. /ɒ/, and mid back long vowel, i.e. /ɔ:/ showed a different behaviour. It was observed that the two phonemes were merged and they were realised as low back short vowels. Their formant frequencies (F1 and F2) remained almost

similar along with their duration of articulation. Hence, on the basis of the analysis, it can be said that PakE speakers realised only four back vowels. The table (Figure 5) displays the formant frequencies of the back vowels as articulated by male speakers of PakE.

Male speakers			
Vowels	F1 (Hz)	F2 (Hz)	Duration (sec)
ɑ:	750	1150	0.101
ɒ	620	1080	0.053
ɔ:	600	1050	0.058
u	390	1070	0.053
ʊ:	340	1050	0.092

Figure 5

The graphic display (Figure 6) of the duration of articulation of the vowels clearly exhibits that /ɔ:/ is articulated as a short vowel by the male speakers of PakE. The average duration of articulation of the back vowels remained 0.101 seconds for /ɑ:/, 0.053 seconds for /ɒ/, 0.58 seconds for /ɔ:/, 0.53 seconds for /u/, and 0.92 seconds for /ʊ:/, which clearly indicates that there are two long back vowels in PakE, unlike SBE which has three long back vowels. Like their formant frequencies, the difference in the durational properties of the vowel /ɒ/ and the vowel /ɔ:/ is insignificant.

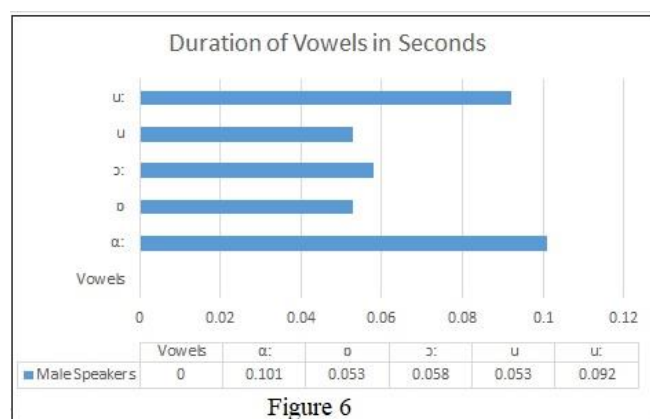


Figure 6

The analysis of the vowel sounds as articulated by the male speakers of PakE showed some idiosyncratic behaviour of the realisation of vowel phonemes. It can be said on the basis of the current analysis that PakE has only nine pure vowels, unlike SBE that has twelve pure vowels. As far as front vowels are concerned, PakE showed a similar tendency to that of SBE as the count of front vowels was four, i.e. /i:/, /i/, /e/ and /æ/. PakE has one long and three short front vowels, with further classification as two high front (/i:/ and /i/), one mid front (/e/), and one low front vowel (/æ/). As far as central vowels are concerned, PakE has only one low-central vowel, i.e. /ʌ/. PakE has no mid-central vowels, unlike SBE that has three central vowels, including two mid-central and one low-central vowel. The phenomenon of back vowels is also unique, as there are four back vowels in PakE, i.e. two long and two short, which are further classified as one low-back long vowel (/ɑ:/), one low-back short vowel (/ɔ/), one high back short vowel (/u/) and one high back long vowel (/ʊ:/). As far as central vowels are concerned, PakE showed a similar pattern as shown by many other Asian Englishes which are reported to have no /ə/ or /ɜ:/ sounds (Deterding, 2007, Gargesh, 2006, Kachru 2005). Many Asian varieties of English are reported to merge the back vowels Deterding, 2007, Gargesh, 2006, Gonzalez & Alberca, 1978 as cited in Bautista & Gonzalez, 2006, Kachru 2005, Zuraidah, 2000 as cited in Bautista & Gonzalez, 2006). In this feature, it is observed that PakE does distinguish between high back vowels as long and short, but as far as the mid and low back vowels are concerned, a merger is visible. The trapezium below (Figure 7) represents the vowel phonemes of PakE as articulated by male speakers.

Pure vowels of PakE as articulated by male speakers

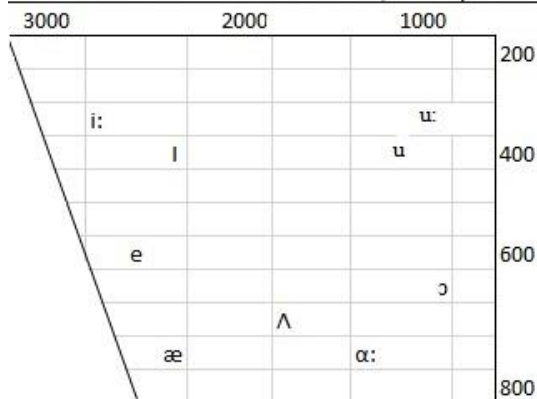


Figure 7

Female Speakers

When it is the analysis of the vowel phonemes, the practice of the language researchers is that separate analysis of male and female sounds is done as female speakers have higher formant frequencies as compared to their male counter parts (Wells, 1962; Clopper, et al, 2005; Hillenbrand, et al, 1995; Ladefogged, 2005). So to acquire adequate and precise results and to reach an accurate conclusion, separate analysis of the sounds of female speakers was opted.

Front Vowels

Like their male counterparts, the female speakers of PakE articulated four front vowels i.e. /i:/, /i/, /e/ and /æ/. The female speakers came out with a similar pattern of articulation like that of SBE. The female participants clearly differentiated between high front vowels /i:/ and /i/ as long and short vowel simultaneously. The difference in the formant frequencies, i.e. F1 and F2, and in the duration of articulation of the two vowels exhibited that the two phonemes were pronounced distinctly. The vowels /e/ was realised as mid front vowel and /æ/ as low front vowel. The statistical analysis, i.e. Tukey’s HSD Test proved that the difference among the formant frequencies of all the vowels was significant, confirming that all the vowels were realised as distinct phonemes. The average formant frequencies i.e. F1 and F2, and the average duration of the articulation of vowels are displayed in the following table (Figure 8).

Female speakers			
Vowels	F1 (Hz)	F2 (Hz)	Duration (sec)
i:	370	2400	0.11
I	430	2250	0.05
e	670	2200	0.05
æ	790	2160	0.06

Figure 8

The average duration of articulation of the front vowels is graphed below (Figure 9).

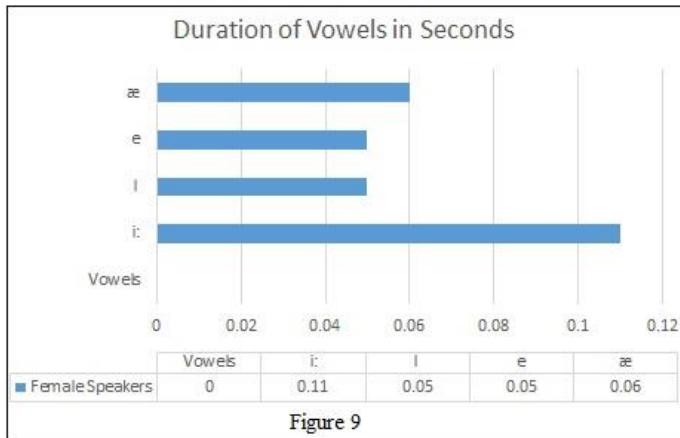


Figure 9

Figure 9 clearly distinguishes among the long and short vowels. The low-front vowel /æ/ is articulated as a short vowel, though it took a little longer as compared to other two short front vowels. Similar phenomenon was observed in the articulation of the male speakers of PakE, where /æ/ relatively took more time as compared to other two short vowels. On the basis of the analysis, it can be stated that PakE has four front vowels, further classified into one long vowel (/i:/) and three short vowels (/i/, /e/ and /æ/).

Central Vowels

Female speakers of PakE, like male speakers of PakE, showed a different behaviour (as compared to SBE) as far as central vowels are concerned. It was observed that the schwa sound, i.e. /ə/ is absent or it had been articulated as full vowel. To put it another way, it may be said that PakE speakers did not articulate /ə/ vowel. The same occurrence was noted for /ɜ:/ sound. It was pronounced as a short vowel. The formant frequencies of the three central vowels, i.e. /ʌ/, /ə/ and /ɜ:/ did not show any significant difference. The statistical analysis proved that the difference in formant frequencies was insignificant. As far as the duration of the vowels is concerned, no vowel was articulated as long vowel. On the basis of the analysis, it can be stated that PakE speakers articulated only a single central vowel, and that too as low-central vowel. The following table (Figure 10) presents the formant values of the central vowels as articulated by the female speakers of PakE.

Female speakers			
Vowels	F1 (Hz)	F2 (Hz)	Duration (sec)
ə	710	1490	0.055
ɜ:	690	1520	0.052
ʌ	700	1500	0.054

Figure 10

As far the central vowels are concerned, PakE shares the features with other Asian varieties of non-native Englishes, which have been reported to have no schwa /ə/ sound or the long central vowel /ɜ:/. Asian varieties have the tendency to merge the central vowels. The result is the only single central vowel /ʌ/. The average duration of articulation of the three central vowels as clearly indicates that all vowels were articulated in almost the same amount of time (Figure 11).

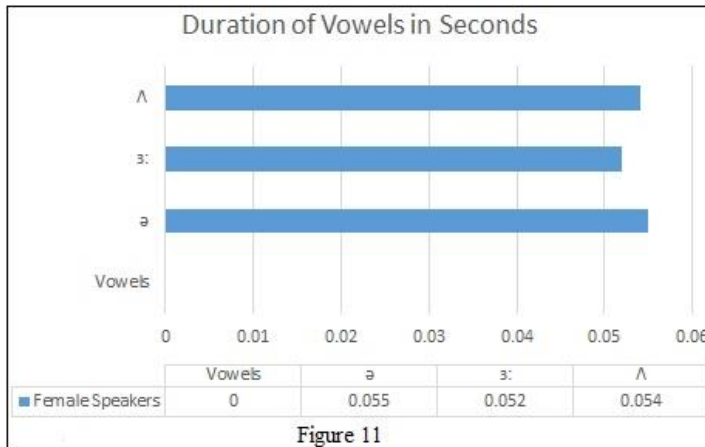


Figure 11

Back Vowels

It has been observed that male speakers realised only four back vowels. The female speakers exhibited somewhat similar pattern. The analysis of the back vowels i.e. /ɑ:/, /ɒ/, /ɔ:/, /u/, and /ʊ:/ showed some variation in the articulation as compared to SBE. Female speakers of PakE differentiated among /ɑ:/, /u/ and /ʊ:/ and realised them as low back long vowel, i.e. /ɑ:/, and short and long high back vowels, i.e. /u/ and /ʊ:/ respectively. The averages of the formant frequencies and the durational properties of these vowels ascertained that they were articulated as distinct vowel phonemes. Tukey's HSD statistical analysis also showed that the difference among the formant frequencies of these vowels and their durational properties was significant. But the low back short vowel, i.e. /ɒ/, and mid back long vowel, i.e. /ɔ:/ showed a different behaviour. It was observed that the two phonemes were merged and they were realised as mid-back short vowels. Hence, on the basis of the analysis, it can be said that female speakers of PakE, like their male counterparts, realised only four back vowels. The table (Figure 12) displays the formant frequencies of the back vowels as articulated by male speakers of PakE.

Female speakers			
Vowels	F1 (Hz)	F2 (Hz)	Duration (sec)
ɑ:	820	1200	0.111
ɒ	600	1120	0.046
ɔ:	580	1120	0.051
u	420	1230	0.05
ʊ:	370	1090	0.118

Figure 12

Figure 13 shows the graphic representation of the duration of articulation of the back vowels as articulated by female speakers of PakE.

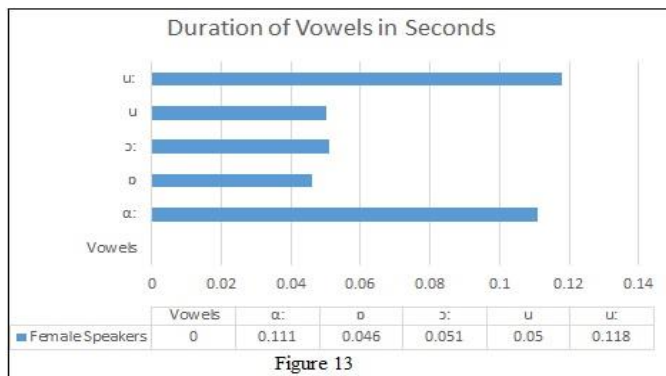


Figure 13

The female speakers of PakE displayed similar pattern of articulation of the vowels as was exhibited by the male speakers of PakE. Female speakers articulated nine pure vowels, including four front vowels, i.e. /i:/, /i/, /e/ and /æ/, one central vowel, i.e. /ʌ/, and four back vowels, i.e. /ɑ:/, /ɔ:/, /u/ and /ʊ:/. Out of nine, only three vowels are realised as long vowels, i.e. /i:/, /ɑ:/ and /ʊ:/, while six are realised as short vowels,

i.e. /i/. /e/. /æ/, /ʌ/, /ɔ/, and /u/. So it can be said that PakE only nine pure vowels. The vowels as articulated by the female speakers of PakE are given below (Figure 14).

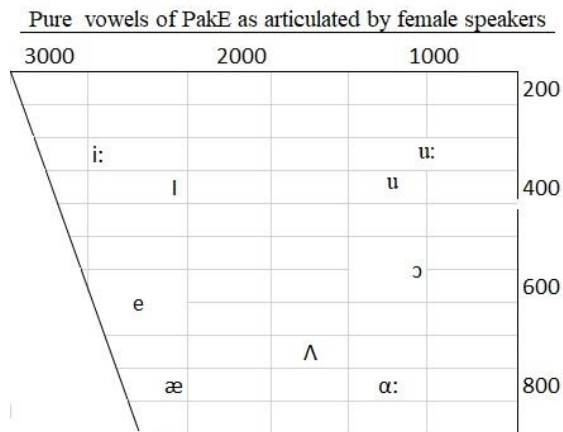


Figure 14

Comparison of Male and Female Speakers

Broadly speaking, the male and the female speakers of PakE maintained a similar pattern of articulation of the vowels. Both came up with nine pure vowels, with four front, one centre and four back vowels. There are a few differences too. The female speakers of PakE took longer in articulating the long vowels. There is another major difference in the articulation pattern, and that is in the merger of /ɒ/ and /ɔ:/. Though both groups of speakers did merge the vowel yet the merger shows some distinction. The male speakers merged the two vowels as low-mid back vowel while the female speakers merged the two vowels as mid-back vowel.

V. CONCLUSION

On the basis of the current analysis, it can be said that PakE is a distinct variety of non-native Asian Englishes with its idiosyncratic features of pronunciation due to vowel phonemes. To be precise and to address the research questions, it can be concluded that PakE has nine pure vowels. It has four front vowels, i.e. /i:/, /i/, /e/ and /æ/, one central vowel, i.e. /ʌ/, and four back vowels, i.e. /ɑ:/, /ɔ/, /u/, and /u:/. On the basis of these results, it can be stated that PakE is different from SBE which has twelve pure vowels. Finally, it can be declared that PakE is a distinct variety of English on the basis of different number of phonemes as according to many linguists (Bauer, 2002; Gimson, 2008; Barber et al, 2009), the difference in the number of phonemes turns a variety into a distinct separate variety of language.

The conclusions drawn in this research are based on a limited data, and to a particular linguistic context. So the results reflect a limited range and may not be generalised. Yet the current study is significant in the sense that it provides a platform to language researchers to conduct their studies in the particular context of PakE to explore its linguistic features on the basis of phonology, lexicology, morphology, syntax, etc. and to variant linguistic contexts.

REFERENCES

1. Abbasi et al. (2018a). *Acoustic characteristics of Pakistani English vowel sounds*. Doi: 10.5539/ijel.v8n5p27
2. Abbasi et al. (2018b). An acoustic investigation of Pakistani and American English vowels. *International Journal of English Linguistics*, (8)4.
3. Ali, R. (2013, July 27). Official language: is it Urdu or English? *The Express Tribune*. <https://tribune.com.pk/story/582574/official-language-is-it-urdu-or-english>
4. Anwer, B. (2007). Urdu-English code-switching: The use of Urdu phrases and clauses in Pakistani English (a non-native variety). *ESP World*, 6(3), 16. Retrieved from http://esp-world.info/Articles_16/issue_16.htm

5. Barber, C., Beal, J., & Shaw, P. (2009). *The English language: A historical introduction*. Cambridge: Cambridge University Press.
6. Bauer, L. (2002). *An introduction to international varieties of English*. Edinburgh: Edinburgh University Press.
7. Baumgardner, J. (1993). The indigenization of English in Pakistan. In Baumgardner, J. (Ed.), *The English Language in Pakistan* (pp. 41-54). Karachi: Oxford University Press.
8. Bautista, M., & Gonzalez, A. (2006). Southeast Asian Englishes. In Kachru, B. Kachru, Y., & Nelson, C. (Eds.), *A Handbook of World Englishes* (pp. 130-144). Oxford: Blackwell Publishing Company.
9. Bilal, H. A. et al (2011a). Acoustic analysis of central vowels of PakE. *International Journal of Linguistics*, (3)1
10. Bilal, H. A., Mahmood, M. A. & Saleem, R. M. (2011b). Acoustic analysis of front vowels of Pakistani English. *International Journal of Academic Research*, 3 (6-I), 20-27.
11. Bilal, H. A., Mahmood, M. A. & Saleem, R. M. (2011c). Merger of /i:/ and /I/ in Pakistani English. *International Journal of Linguistics*, 3 (1), E34. doi:10.5296/ijl.v3i1.1041.
12. Bilal, H. A., Mahmood, M. A. & Saleem, R. M. (2011d). Merger of /e/ and /æ/ in Punjabi English. *International Journal of Academic Research*, 3 (6-II), 407-412.
13. Bilal, H. A., et al. (2021a). Acoustic investigation of back vowels of Pakistani English. *Review of Education, Administration & Law*, 4(1), 37-52.
14. Bilal, H. A., et al. (2021b). Diphthongs of Pakistani English. *Elementary Education Online*, 20(5), 4920-4931.
15. Clopper, C. G., Pisoni, D. B., & de Jong, K. (2005). Acoustic characteristics of the vowel systems of six regional varieties of American English. *The Journal of the Acoustical Society of America*, 118(3 Pt 1), 1661-1676. <https://doi.org/10.1121/1.2000774>
16. Cruttendon, A. (2008). *Gimson's Pronunciation of English*. London: Arnold.
17. Deterding, D. (2007). *Singapore English (Dialects of English)*. Edinburgh: Edinburgh University Press.
18. Gargesh, A. (2006). South Asian English. In B. Kachru, Y. Kachru and C. Nelson. Eds, *A Handbook of World Englishes*. Oxford. Blackwell Publishing Company. pp. 90-113.
19. Hassan, S. & Imtiaz, S. (2015). Acoustic analysis of back vowels (/ɒ/ and /ɔ:/) in Pakistani English. *Global Journal of Human Social Science Linguistics & Education*. (15)11.
20. Hickey, R. (2005). South Asian Englishes. In Hickey, R. (Ed.), *Legacies of Colonial Englishes* (pp. 536-558). Cambridge: Cambridge University Press.
21. Hillenbrand, J. M., Clark, M. J., & Nearey, T. M. (2001). Effects of consonant environment on vowel formant patterns. *Journal of the Acoustical Society of America*, 109 (2), 748-763.
22. Hillenbrand, J., Getty, L., Clark, M. & Wheeler, K. (1995). Acoustic characteristics of American English vowels. *The Journal of the Acoustical Society of America*. 97. 3099-111
23. Kachru, B. (2005). *Asian Englishes: Beyond the cannon*. Hong Kong: Hong Kong University Press.
24. Kennedy, A. (1993a). A bribe by any other name...: Terms of gratification in Pakistani English. In Baumgardner, R. (Ed.), *The English Language in Pakistan* (pp. 204-211). Karachi: OUP.
25. Kennedy, A. (1993b). Of dacoits and desperados: Crime reporting in Pakistani English. In Baumgardner, R. (Ed.), *The English Language in Pakistan* (pp. 69-79). Karachi: OUP.
26. Ladefoged, P. (2005). *Vowels and consonants*. Oxford: Blackwell Publishing.
27. Mahboob, A., & Ahmar, N. (2004a). Pakistani English: Phonology. In Schneider, E. W., Burrige, K., Kortmann, B. Mesthrie, R. & Upton, C. (Eds.), *A Handbook of Varieties of English*, 1, (pp. 1003-1016). Berlin: Mouton de Gruyter.
28. Mahmood, M. A. & Farooq, M. (2017). *Identification of triphthongs in Pakistani English*. DOI:10.5539/ijel.v8n1p184
29. Mahmood, A. M. & Farooq, M. (2018). Acoustic analysis of front vowels /ɛ/ and /æ/ in Pakistani Punjabi English. *International Journal of English Linguistics*, (8)1
30. Mesthrie, R., & Bhatt, M. (2008). *World Englishes: The study of new linguistic varieties*. Cambridge: Cambridge University Press.
31. Peterson, G. E., & Lehiste, L. (1960). Duration of syllable nuclei in English. *Journal of the Acoustical Society of America*, 32, 693-703.
32. Roeder, R. (2009). The effects of phonetic environment on English /æ/ among speakers of Mexican heritage in Michigan. *Toronto Working Papers in Linguistics (TWPL)*, 31. Retrieved from <http://twpl.library.utoronto.ca/index.php/twpl/article/viewFile/6090/3092>
33. Sheikh, Q. A. (2012). An analysis of the vowel sounds of Pakistani English. *Bulletin of Education and Research*, (34).pp.1-18
34. Tallat, M. (2002). *The form and function of English in Pakistan* (Doctoral dissertation). Retrieved from <http://eprints.hec.gov.pk>

35. Tallat, M. (2003). Pakistani English: A sociolinguistic variety. *Journal of Research*, 4, 17- 30.
36. Tobin, T. W. (2020). *Cultural imperialism*. *Encyclopedia Britannica*. <https://www.britannica.com/topic/cultural-imperialism>
37. Tomlinson, J. (2001). *Cultural Imperialism: A critical introduction*. London: Continuum.
38. Wells, J. C. (1962). *A study of the formants of the pure vowels of British English*. (MA Thesis) Retrieved from <http://www.phon.ucl.ac.uk/home/wells/formants/index.htm>