An Analysis of Problematic Vowel Sounds for College Level Students in District Buner

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ABSTRACT:

Pronunciation plays a vital role in daily life communication. It has great impacts on both speaking and listening. The main purpose of the current study was to analyze the problematic vowel sounds for the college level learners in District Buner. Moreover, it aimed at comparing the formant frequencies (F1 and F2) with the formant frequencies of native speakers. For this purpose, the researcher took 20 words having vowel sounds at the middle position. 20 students were included in the study through representative sampling technique. Their pronunciations were recorded in a sound proof room. The spectrograms of the vowel sounds were taken using PRAAT Software on computer which gave the formant frequencies (F1 and F2). The average frequencies of the target participants were calculated which was compared with the formant frequencies of the native speakers to find the problematic vowel sounds for Pashto speakers. The study is quantitative in kind. Results showed that English diphthongs were more problematic for the college level Pashto speaking students in District Buner. Diphthongs /ɔɪ/, /ʊə/, /eɪ/ and /aɪ/ were found highly problematic for Pashto speakers while the three diphthongs /ɪə/, /eə/, and /aʊ/ were found less problematic for them. Highly problematic monophthongs were /ʊ/, /e/, /ə/, /æ/, and /ɔː/. The remaining monophthongs were found less problematic for them. The current study left a research gap for future researchers to explore vowel sounds at the initial and final positions of words.

1. INTRODUCTION

Pronunciation plays a vital role in daily life communication. Being a sub-skill, it has been neglected in the syllabi of educational institutions by not giving proper weightage as compared to other skills like reading, writing and speaking skills. Pronunciation has high impacts both on speaking and listening (Ahmad & Irshad, 2023). To improve pronunciation skill, one needs to have some expertise in phonetics and phonology. Phonetics is defined as the study of ways in which speech sounds are originated and produced. Phonetics deals with the physical features of speech sounds including articulation of sounds, acoustic properties and auditory perception. It is general and it examines individual speech sounds across languages. Phonology, on the other hand, deals with the mental representation of phonemes or sounds within a specific language (Delahunty & Garvey, 2010). Linguists use the IPA, International Phonetic Alphabet, to explain sound systems. IPA contains symbols which show all those phonemes which have been established in human languages. A phoneme is a sound which makes a difference in a language regarding meaning. Several languages in the world use different sets of phonemes for the human communication (Freeman & Freeman, 2004). Generally there are forty four phonemes/sounds in English language. Out of which 20 are vowel sounds and 24 are consonant sounds. Consonant sound is a type of phoneme which is produced with certain kind of hindrance or obstruction. The airflow is released after such obstruction by articulators (Syed et al. 2017). On the other hand, vowel sound is a type of sound which is produced without any hindrance or obstruction by the speech organs called articulators when air passes through the wind pipe that is from the larynx to lips (Roach, 2009).

Students face multiple issues during speaking with one another. Spelling of English words create problems in correct pronunciation. The silent letters in most of the English words also create problems in correct pronunciation. Lack of one to one correspondence between letters and sounds is another major issue in English language. Moreover, there are some sounds which are not present in the mother language (L1) of the students (Riadi, Rufines, & Novita, 2013).

Pashto is said to be the mother language (L1) of Pashtun people living in the areas of Afghanistan and in the north western areas of Pakistan. Pashto is considered to be split ergative language. All types of opinions and ideas can easily be expressed in it. Pashto is the official and national language in Afghanistan. It is the medium of communication and education in the country. There are about fifty million Pashto speakers globally. After Punjabi, Pashtun are the second most major portion in Pakistan as estimated in 2017 Census. It is spoken in the Khyber

Pakhtunkhwa (KPK) province in Pakistan. There are 5 major dialects in Pashto language, i.e Quetta dialect, Qandahar dialect, Middle dialect, Central dialect, and Yousafzai dialect. Yousafzai dialect is considered to be the standard and prestigious dialect among others. Pashto has its own phonological system. It has 27 consonants and 9 vowel sounds in the Yousafzai dialect of Pashto (Shahabullah, Khan, & Hussain, 2022). In the Pashtun-based province of Pakistan that is Khyber Pakhtunkhwa (KPK), Pashto is taught in the educational institutions from first grad to grad 12 mostly in government based institutions (Farooq, 2004).

For the analysis and evaluation of vowel sounds, Frequencies of phonemes are drawn using different tools. PRAAT is a computer-based software which is used to analyze the frequencies of vowel sounds. When sounds are recorded and saved in digital format, they are analyzed using its frequencies. Waves and spectrographs of phonemes are designed and analyzed. Their pitch, intensity, formants and duration are recorded and analyzed. Every vowel sound has a pattern of 2 or 3 prominent frequencies which are said to be formants (Fasold, 2013). There are 20 vowel sounds in English language. These 20 vowel sounds included monophthongs and diphthongs which are: **/ i: /, /ɪ /, / e /,/ æ /, / ʌ /, / ə /, / ɑː /, /ɒ /, / ɜː /, / ɔː /, / uː /, / ʊ /, / eɪ /, / ɔɪ /, / aɪ /, / aʊ /, / əʊ /, / ɪə /, / ʊə /, / eə /.** Monophthongs are single vowels or pure vowel sounds in the production of which no noticeable change in vowel quality is examined or observed. Out of the total vowel sounds, 12 are monophthongs and the remaining 8 are diphthongs. "Diphthongs are such sounds which are made by gliding from one vowel sound to another vowel sound" (Yule, 2010). Quadrilaterals of both monophthongs and diphthongs are given as.
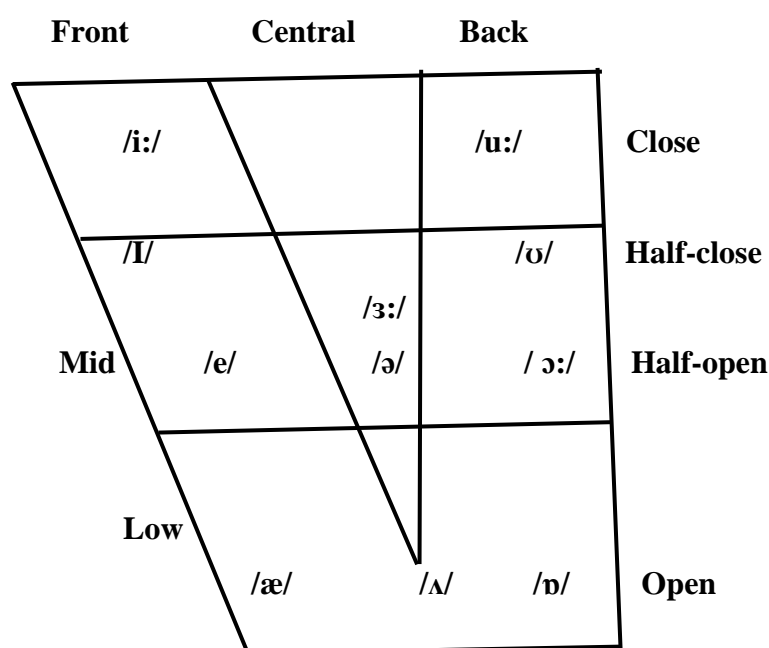
/ɑ:/

Fig 1.1 Monophthongs
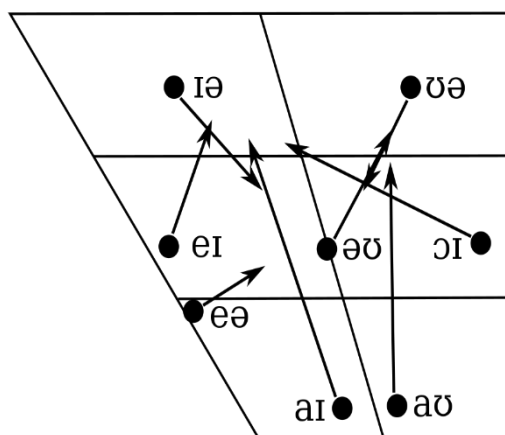
Fig 1.2

Research Objectives

The main research objectives of the current study are given as:

i.   To explore the vowel sounds which are difficult in pronunciation by the college level students in District Buner.

ii. To compare their vowel frequencies with the native vowel frequencies.

Research Questions

Following are the research questions of the current study.

i.   What are the vowel sounds which are difficult in pronunciation by the college level students in District Buner?

ii. How their vowel frequencies be compared with the native vowel frequencies?

2. LITERATURE REVIEW

Mother language has great impacts on learning a target language. Pashto is the mother language (L1) of the target students. Many studied have been conducted in which various inventories have been suggested and invented. For instance, Tigey & Robson (1996), stated and mentioned three major dialects which are: Western dialect (Kandahar), Eastern dialect (Ningrahar), and Central dialect (Kabul). There are 9 vowel sounds in the central (Kabul) dialect of Pashto according to the said research.

Correct pronunciation is important in learning a foreign language including English. Poor pronunciation of words causes obstacles in understanding language properly which has bad impacts on communication. The motive of the current research work is to analyze the problematic vowel sounds for Pashto speakers in District Buner. Studying vowel sounds are tricky and they have little difference among them. Therefore, this study is helpful for students and teachers to identify those vowel sounds which are difficult in pronunciation. It also covers the existing research gap. This research work is helpful for students to differentiate the vowel sounds which are missing in their native language i.e Pashto.

A study carried out by Rahman, (2016) compared the consonant sounds of Pashto and English. Similar and different consonant sounds are investigated in the study. It particularly focuses on the consonant sounds which are absent in other languages. Results show that some Pashto consonant sounds are absent in English. However, some of the Pashto consonant sounds have different place of articulation but similar manner of articulation. Similarly, some of the English consonant sounds are absent in Pashto language.

Another related and important study investigates acoustic characteristics of long vowel sounds of English by speakers of Pashto language. Data was taken from 10 Pashto speaking students of English via a good quality tape recorder. PRAAT software was used to analyze the data by considering Formant frequencies F1 and F2. Frequencies of these students were compared to the frequencies of native speakers. Results indicate that long vowel sounds like /I:/ and /a:/ were found more problematic for them. A major difference was observed in both the backness and height of the English vowel sounds by Pashto speaking students (Ahad & Hamid, 2020).

Similarly, a study was conducted in which the Pashto vowel sounds were analyzed acoustically. In the study the nine vowel sounds of Pashto were analyzed. Frequencies (F1 and F2) and duration of each vowel sound were recorded. A quadrilateral was mapped for these vowel sounds which gave idiosyncratic quality of these Pashto vowels (Rahman & Din, 2011).

Moreover, another study aims at investigating the phonological errors with regard to segmental characteristics committed by ESL Pashto learners in District Swabi. Data was collected through audio recording from the participants which included both male and female. Findings show that mother language has great impact on the pronunciation of speaking English (Ali, Mahmood, & Ahmad, 2022).

Lastly, another research explored the pronunciation of Pashto speaking ESL learners and its main psychological factors influencing their pronunciation. The study adopted mixed approach. Data was collected using interview, observation and recording as research tools. PRAAT software was used to analyze the vowel sounds by Pashto speakers. Results show that diphthongs are more difficult to be pronounced by the target students while some monophthongs were found to be more problematic than others. Moreover, factors like overuse of L1, inappropriate environment, lack of confidence, anxiety and fear of negative feedback resulted in weak pronunciation of English by Pashto speaking students (Ikramullah et al. 2023).

The above interpretation of past studies show that researchers investigated and explored by comparing consonant sounds of Pashto and English, doing acoustic analysis of long vowel sounds of English produced by Pashto speakers, finding factors affecting correct pronunciation of English by Pashto speakers, and exploring phonological errors committed by ESL Pashto speakers. However, no one investigated the vowel sounds of English by Pashto speaking college level students. Therefore, the current study aimed at exploring the problematic vowel sounds of English by Pashto speakers.

3. RESEARCH METHODOOLOGY

This research study is quantitative in kind. Data was taken from the 20 college level students of Ghazali School and College District Buner. Students from several regions of the district read in the mentioned college. Students of ten villages, two students from each village, were included in the study. The current research study is meant to be generalized to all Higher Level students of District Buner. As it was beyond the approach of the current research work to examine all speakers in the aforementioned district. That is why, a representative sample was taken for investigation. The pronunciation of words containing 20 vowel sounds by the target students were recorded. They were analyzed through PRAAT software. The formant frequencies (F1 and F2) were taken from the spectrograms. F1 indicates height of vowel sound and F2 indicates backness of vowel sound. Average Formant frequencies were calculated which were compared with native speakers' formant frequencies. Data was collected through recording, which is the main research instrument in the study. Table shows the participants' data.

Table 3.1 Showing participants data

S.#	No. of Participants	Gender	Grade	Region	College Name	Mother language
1	20	Male and female	11th and 12th	10 Villages of District Buner	Ghazali School & College Buner	Pashto

4. RESULTS AND DISCUSSIONS

The frequencies of both pure vowel sounds and diphthongs or glides are drawn from the spectrograms using PRAAT Software on computer. Spectrograms of each student is observed and examined by taking frequencies from it. The frequencies (F1 and F2) of all students were tabulated using MS Excel sheet. Then average frequencies of all twenty vowel sounds are calculated. The average formant frequencies (F1 and F2) were compared with the frequencies of the native speakers. Separate tables are given for both pure vowel sounds and diphthongs. Results of all vowel sounds were compared and given in the tables below.

According to Sing (1982) as cited by (Li, 2004) difference between vowel phonemes can be investigated in terms of their formant frequencies and its place of articulation. F1 shows height of vowel sound which means that higher the position of tongue, higher will be the vowel sound. Resultantly formant frequency (F1) will be lower. F2 represents tongue position and rounding of lips. F2 identifies some degree of backness of vowels. Backward the tongue position, vowel is thought to be round and its F2 Formant frequency will be higher. Formant values are different for different speakers and accents. The table of monophthongs with their average formant frequencies (F1 and F2) are compared with the formant frequencies (F1 and F2) of the native speakers.

Table 3.1 Showing Average Formant Frequencies (F1 and F2) of pure vowel sounds.

Words	Monophthongs	Average F1 and F2 of Pashto Speakers		F1 and F2 of Native Speakers	
		F1/Hz	F2/Hz	F1/Hz	F2/Hz
Seat	/ i: /	338	2271	296	2241

Slip	/ i /	411	1872	396	1839
Food	/ u: /	382	1586	386	1587
Good	/ ʊ /	563	1337	395	1408
Met	/ e /	646	1428	532	1656
Collect	/ ə /	329	1771	500	1500
Word	**/ ɜ: /**	509	1417	519	1408
Sat	/ æ /	492	1703	667	1565
Law	**/ ɔ: /**	674	1012	480	857
Much	**/ ʌ /**	657	1242	661	1296
March	**/ ɑ: /**	667	1204	680	1193
Pot	**/ ɒ /**	676	1071	643	1019

Following is the spectrogram of a monophthong (pure vowel sound) showing frequencies F1 and F2.
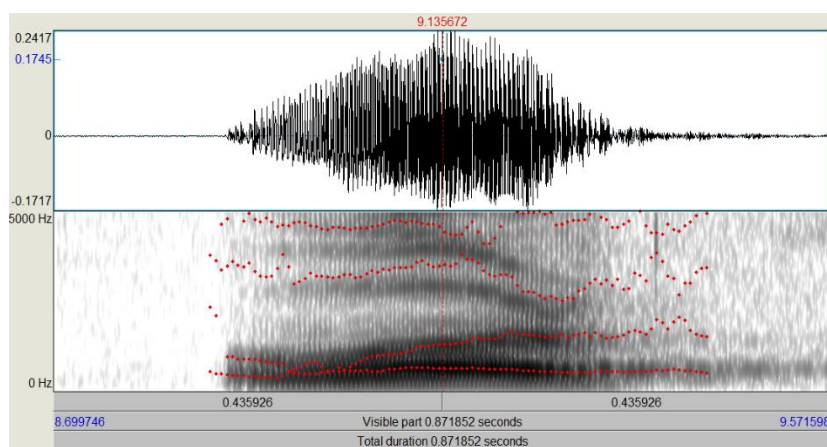

Figure 3.1 Spectrograph of Monophthong

Diphthongs show a turn from one vowel sound to another vowel sound. Results of the diphthongs are given in a separate table. The average Formant Frequencies (F1 and F2) of the eight Diphthongs are compared with the average Formant Frequencies (F1 and F2) of the native speakers. The selected words contain diphthongs at the middle position are pronounced by the target participants. The combined table of frequencies is given below.

Table 3.2 Average Formant Frequencies (F1 and F2) of Diphthongs.

Words	Diphthongs	Average F1 and F2 of Pashto Speakers		F1 and F2 of Native Speakers	
		F1/Hz	F2/Hz	F1/Hz	F2/Hz
Take	/ eɪ /	605	2451	767	2277
Light	/ aɪ /	531	1772	442	1955
Boys	/ ɔɪ /	659	2634	518	2401
Hear	/ ɪə /	350	2032	374	2058
Pure	/ ʊə /	623	1417	460	1215
Where	/ eə /			374	2486
		397	2542		
Boat	/ əʊ /	586	1034	567	1039
House	/ aʊ /			331	1254
		376	1225		

Following is the spectrogram of a diphthong showing frequencies F1 and F2.
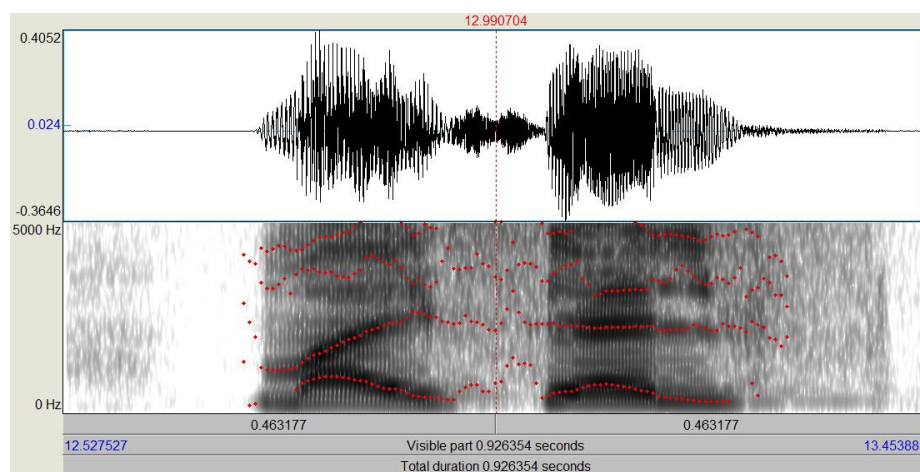
Figure 3.2 Spectrograph of Diphthong

On the basis of results it is found that the college level students in District Buner face problems in the correct pronunciation of vowel sounds when they pronounce words having vowel sounds at the medial position of words. These problems varied from height of the vowel sounds to the backness of the vowel sounds. It is found that English diphthongs are more

problematic for the college level Pashto speaking students in District Buner. Diphthongs /ɔɪ/, /ʊə/, /eɪ/ and /aɪ/ are found highly problematic for Pashto speakers while the three diphthongs /ɪə/, /eə/, and /aʊ/ were less problematic for them. Highly problematic monophthongs are /ʊ/, /e/, /ə/, /æ/, **/ɔ:/. The remaining monophthongs were found less problematic for them.**

5. CONCLUSION AND RECOMMENDATIONS

The current study aimed at analyzing problematic vowel sounds for Pashto speaking college level students. The study is quantitative in nature. The major research tool was recording. Data was taken from 20 college level students through representative sampling technique. The study analyzed the Formant frequencies (F1 and F2) of the twenty vowel sounds including monophthongs and diphthongs using PRAAT Software on computer. The average frequencies of the target participants were calculated which was compared with the formant frequencies of the native speakers to find the problematic vowel sounds for Pashto speakers. All the frequencies were taken from the spectrograms. Results of the study show that some monophthongs are more problematic than others which were less problematic for them. Comparatively diphthongs were more problematic vowel sounds for them.

The study is related to phonetics and phonology. It aims at investigating the vowel sounds which are problematic for the college level students Pashto speakers in District Buner. It is based on the analysis of formant frequencies (F1 and F2) which was compared with the formant frequencies of native speakers. Both F1 and F2 indicate height and backness of vowel phonemes respectively. On the basis of the results and findings of the study, it is recommended that researchers should consider primary and secondary level school students because such students are promoted to college. They should also explore the vowel sounds at the final and initial position of words. Similarly, the college level students must focus on their pronunciation by doing practice on phonemes and transcription of words. Teachers should include them in their lectures as compulsory part. Moreover, it is recommended for the government should make that Post Graduate Diploma (PGD) in TEFL as mandatory and compulsory for those teachers who teach English in schools and colleges. Otherwise 3-month course/certificate of phonetics and phonology should be made mandatory for all English teachers.

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