Linguistics and Literature Review
(LLR)
HEC 'Y' Category
ISSN: 2409-109X Online,
ISSN: 2221-6510 Print
Volume 7, Issue 1, March 2021

A publication of the
Department of Linguistics and Communications
Institute of Liberal Arts
University of Management and Technology

Article:	**The Acoustic Effect of Urdu Phonological Rules on English Speech**

Author(s):	Mahwish Farooq, Asim Mahmood

QR Code:

Mahwish Farooq

Estd. 1990

_____

The Acoustic Effect of Urdu Phonological Rules on English Speech

Mahwish Farooq
University of Central Punjab- Lahore, Pakistan
Asim Mahmood
Government College University- Faisalabad, Pakistan

ABSTRACT

The paper is about the acoustic effect of Urdu phonological rules on Pakistani Urdu speakers' English speech. The objective of the study is to discuss the phenomenon of multiple pronunciations of an English word that has the same spellings, meaning, and part of speech but different pronunciations in the English speech of Urdu speakers. Sometimes these alternative pronunciations are considered mispronunciation rather than multiple pronunciations. The primary purpose of this study is to make a boundary-line between mispronunciations and multiple pronunciations of English vocabulary. Thus, an acoustic analysis of Urdu speakers' English speech has been done by collecting speech data of 30 Urdu speakers from the Public sector universities of Pakistan. Consequently, this paper caters to language-dependent variations of Urdu. This paper only deals with three phonological rules, i.e., segment alternation, ellipsis, epenthesis, which become the cause for re-syllabification of English words. These three foci of research have been selected because the data analysis has confirmed that the 'multiple pronunciation' is mainly occurred due to these three elements. These three categories cover several sub-categories that cover many instances in the data analysis. The data also confirms that phonological variations occur due to stress shifting in Urdu speakers' English speech in Pakistan.

Introduction

In Pakistan, Urdu is the national and official language, but it has 100 million speakers worldwide. They have multiple pronunciations and accents (Farooq, 2015), which ultimately become the reason for phonological variations and rules (Farooq & Mumtaz, 2016). English is a second language, and it also enjoys the status of an official language and lingua franca in Pakistan (Zia, 2011). The hypothesis of this research is; Urdu phonological rules directly influence the English pronunciation of Pakistani Urdu speakers. The reason is the observation of alternative pronunciation of English vocabulary, but more interestingly are equally intelligible among L2 English speakers in Pakistan. For example, a word 'beautiful' [bjutifʊl] has two more alternative pronunciations; /bəju:tifʊl/ and /brjutiful/; secondly the word 'exact' (in British English /ɪgzəkt/)

CONTACT Mahwish Farooq at mahwishfarooq4@gmail.com

is articulated in three different forms as /ægzækt/, /ɪgzækt/, /əgzækt/, etc. it is necessary to investigate the acoustic effect of Urdu phonological rules on Pakistani speakers' English speech. This research will also prove significant among interdisciplinary studies such as Morphology, Sociolinguistics, World Englishes, ELT, ESL, etc. So, this research is based on the phonetic analysis of English speech after finding out the influence of L1. Phonological rules provide information about possible phonemic combinations and multiple/alternative pronunciations in a given language (Odden, 2005). In other words, the phonological rules can serve as a substitution of the word morphology. The reason is; phoneme is the basic unit of speech (language) that also influences words' morphology. So, it is considered important for the possible morphological combinations for constructing a meaningful word form with alternative pronunciations (Jehsen, 2004). Moreover, phonological variations are inevitable and unconscious in connected speech (John, 1980).

The results will find out multiple pronunciations or mispronunciations of English wordlist in the speech corpus of 30 Urdu speakers (Haq et al., 2013). Therefore, such words have been selected for making a script that has the same spellings, part of speech, and most importantly meanings but with different pronunciations. Though, this research is based only on three phonological rules, i.e., phonemic (i) alternation (e.g., 'great' /greɪt/ is alternatively pronounced as /gre:t/ after replacing a diphthong with a monophthong), (ii) ellipsis (e.g., 'no' /nəʊ/ is alternatively pronounced as /no:/), and (iii) epenthesis (e.g., 'we' /vi/ is alternatively pronounced as /vui/) which are directly responsible for multiple or alternative pronunciations. The major reason to select only three phonological rules is; these are the broader terms and can be divided further into several sub-categories. The second reason is their random and major occurrence in the English speech of Pakistani Urdu speakers.

It is also true that multiple pronunciations are controversial speech elements confuse language users (Crystal, 2003). Multiple pronunciations of an English word (e.g., 'delicious' /dəlɪʃɪəs/ is alternatively pronounced as /dəliʃɪəs/ or /diliʃɪəs/) may be problematic for English (native) speakers. In the connected English speech of Pakistani speakers, the sound change rules are almost similar to other languages. However, Urdu phonological rules have highly influenced their speech, i.e., the segmental assimilation [i.e., (bilabial assimilation in انبار /ənbar/ is pronounced as /əmbar/), (velar assimilation اگّر /əgər/ as /əɣər/)], segment deletion and vowel lengthening in the word بادشاه /baḏʃəh/ as /baḏʃa/ (Hussain, 2005), segmental deletion e.g., in the word خواب /xəvab/ as /xab/ (Nawaz, 2002), segment insertion (e.g., in the word 'عقل /əql/ as /əqəl/ (Akram, 2002), etc. These phonological rules are also responsible for the multiple pronunciations or alternative surface forms of already existing phonetic transcription of Urdu (Farooq & Mumtaz, 2016) and English vocabulary. The reason is; Pakistani L2 speakers overgeneralized (Farooq, 2021) the Urdu phonological rules in the articulation of English speech. There are different Urdu phonological rules, but this research has analyzed the acoustic effect of only three main categories i.e., (i) phonemic alternation, (ii) phonemic deletion, and (iii) phonemic insertion. The foremost reason to select only three phonological categories is their broader perspective, as these are further divided into different sub-categories. The second reason is their high-frequency rate of occurrence

in the English speech articulation of L2 Pakistani speakers. This research has a larger scope and significance for finding out the influence of L1 on English, and this will ultimately resolve the concept of mispronunciation by considering their English as a Pakistani English (PakE) variety.

Literature review

According to a survey, there are 350 million non-native English speakers worldwide, but the majority of English speakers are multilingual (Kirkpatrick, 2010). The research deals with Urdu phonological rules' acoustic effect on the English speech of Urdu speakers in Pakistan, and consequently, it would confirm the effect of L1 on L2. Previous literature also has confirmed these phonological variations are based on speech quality (Finch, 2000) and phonological rules in different languages, i.e., Russian, Czech, Japanese, Hungarian, English, Finish, Setswana, Dutch, and Shona (Panevov & Hana, 2010). The voice quality proves an important factor that caters to the habitual variation in the vocal apparatus of speakers to know the accent variation and multiple pronunciations of a word. The voice quality can provide speakers vocal apparatus variations by considering phonemes/speech segments' momentary actions/speech segments (Kreiman, Jody; Sidtis, Diana Vanlancker; Gerratt, Bruce, 2014). Every language has a different set of phonemes (Jehsen, 2004), but they lose their phonemic features in coarticulation (Roach, 2009), therefore, it is considered a complex phenomenon (Hall, 2005). According to another research, Vander has repo; motivations behind multiple pronunciations; (i) language change rules, and (ii) speakers' attitude to some phonological rules (as cited in Hulst, 1979).

According to the Sound Change Theory, sound change rules are inevitable to control in coarticulation (Ohala, 1980) due to their inherent variations; the "non-programmed features" of alternative or multiple pronunciations have occurred (John, 1980), (Odden, 2005). Nevertheless, these segmental features prove insufficient (Hall, 2005) because the auditory transcription process has a drawback that cannot reduplicate human speech with traditional phonetic symbols for catering the alternative pronunciations. Therefore, such pronunciation differences must be catered under the umbrella term of "phonetic grammar" of a language (Odden, 2005) based on each given language's phonological rules. Various phonological rules have been discussed among different languages, i.e., assimilation, deletion, voicing, insertion, segment alternation, aspiration, nasalization, etc. (Finch, 2000). But only phonemic alternation, epenthesis, and ellipsis have been discussed in the subsequent sections according to the scope of this research. Above mentioned three phonological rules have been selected because the alternative pronunciation is primarily occurred due to these phonological rules. These phonological rules have been majorly observed in previous studies and covered larger phonological variations in our speech corpus.

Phonemic alternation

It occurs with a substitution of one phoneme with another. Morphology of any language does not allow any alternative pronunciation, but it is the phonology that supplies the phonological information in different contexts and allows a phoneme to replace its stereotypical characteristics (Finch, 2000). Consequently, these phonological variant segments are called "alternants". It is considered the first main principle for the alternative pronunciation;

"except in case of suppletion, every morpheme has only one phonological form. Any variation in the phonetic shape of a morpheme results from the operation of regular phonological rules."

<div align="right">(Jehsen, 2004)</div>

Phonemic alternation plays a primary role in multiple or alternative pronunciations. In connected speech, the substitution of phonemes is called phonemic alternation. An alternation rule can be written generally as; A → B / X____Y where 'A' phoneme converts into 'B' phoneme in 'X to Y' context (Jehsen, 2004). Sometimes, a phoneme may lose its segmental features wholly or partially, i.e., in the Hindi language, a nasal consonant may convert its preceding oral vowel into a nasal vocalic phoneme (Trigo, 2006). In Czech and German languages, the word-final voiced obstruent may be converted into voiceless stops. In some Spanish dialects, a voiced stop can substitute with a fricative if it is surrounded by a vowel sound (Panevov & Hana, 2010). In the Turkish language, a voiced consonant becomes unvoiced at the syllable-final position, but this phenomenon does not apply to voiced fricatives and sonorants (Hulst & Weijer, 1991). In the Persian language, the /r/ phoneme can appear in three alternative or allophonic forms, i.e., [r], [r̥], and [ɾ], depending on different contexts (Jehsen, 2004). In the Lithuanian language, the voicing-assimilation is a common phonological rule (Odden, 2005).

Ellipsis

A phonemic deletion is also called elision or ellipsis. It is a common but most important coarticulation feature (Finch, 2000). It is a complicated phenomenon as elision also causes re-syllabification of a word or syllable (Kahn, 1976). It is speaker-dependent laziness in connected speech production (Waqar & Waqar, 2002). Various types of segment deletions have been reported in different languages. For example, in the Hindi language, a short vowel schwa deletion occurs if a long oral vowel comes after a short vowel schwa, and a nasal consonant deletion occurs if a nasal vowel comes after it (Trigo, 2006). In the English language, the phenomenon 'Relative Functional Load (RFL)' has reported the deletion of schwa, if a schwa comes between two consonants i.e., preceded by an alveolar consonant and followed by an unstressed /n/ or /l/, then the following unstressed consonants attain the syllabic features by deleing the preceding schwa vowel (Murcia, Brinton, & Janet, 2010) and word-final /ə/ is deleted if preceded before a stressed syllable (Nawaz, 2002). In the Turkish language, the velar phoneme /g/ is deleted at syllable medial and syllable-final positions to convert preceding a short vowel to a long vowel (Hulst & Weijer, 1991).

Epenthesis

The phonemic addition in a word is called insertion/epenthesis (Mendoza, 2012). There are different reasons for epenthesis in a connected speech, i.e., (i) articulation time (Panevov & Hana, 2010), (ii) the speakers' attitude, and (iii) language change phenomenon (Hulst, 1979). The addition of a phoneme in a syllable or a word is called epenthesis (Mendoza, 2012). Different phonemic insertions have been reported in several languages. For example, in the Turkish language, the consonant cluster breakage has been reported at both onset and coda positions (Hulst

& Weijer, 1991). In the Armenian language, an initial consonant cluster can be divided into a schwa vowel insertion. In the Lomongo language, the insertion of /j/ has been reported in the compound words (Odden, 2005). Urdu also has several phonological rules that are responsible for multiple pronunciations (Farooq, 2021; Farooq, Mahmood, & Ali, 2020; Farooq, 2015). Some are reported in the following sections.

Urdu phonological rules

Different Urdu phonological rules are explained in several research studies but only discussed the segmental features such as; (i) velar assimilation, (ii) nasal assimilation, (iii) bilabial assimilation, (iv) /h/ deletion (Hussain, 2005), /ʔ/ deletion (Nawaz, 2002) and /ə/ insertion (Akram, 2002) in Urdu speech production. Another research has reported different scripts of the same vocabulary (or multiple transcriptions) in three Urdu corpora (Habib, Hijab, Hussain, & Adeeba, 2014). The corpora highlighted words with multiple scripts (or transcriptions); therefore, research has been designed to confirm whether those were only written variations or could exist in speech as well. Later research has confirmed the phonological variation in Urdu speakers' speech (Farooq & Mumtaz, 2016). However, another research has reported that segment features are insufficient to explain multiple pronunciations in the Urdu language. Therefore, the phonology of connected Urdu speech depends on different factors, i.e., stress patterns, vocalic glottalization, phonemic features, the contextual effect of phonemes, restructuring, and re-syllabification (Farooq, Mahmood, & Ali, 2020). The reported phonological rules are:
1. Phonemic Alternation in Urdu
2. Ellipsis in Urdu
3. Epenthesis in Urdu

Phonemic alternation in Urdu

Urdu speech has reported various phonemic 'alternants,' but a native Pakistani Urdu speaker can pronounce one 'alternant' at a time (Farooq & Mumtaz, 2016). Urdu vocabulary has alternative pronunciation, which is equally comprehensible among all Urdu speakers of the world. For example, a word احترام (respect /ehtera:m/) has four more pronunciations i.e., /ɪhtəra:m/, /ehtəra:m/, /æhtəra:m/, and /æhtera:m/, and the most important thing is; all these instances are equally comprehensible by all Urdu speakers in Pakistan (Farooq, Mahmood, & Ali, 2020).

Ellipsis in Urdu

An Urdu speaker articulates minimally due to laziness which directly becomes a cause of alternative pronunciation. Both consonant and vowel may be deleted in connected speech articulation. Phonemic deletion may reduce the number of syllables in a word, i.e., vowel reduction causes syllable deletion while consonant reduction may or may not affect syllables in a word (Waqar & Waqar, 2002), e.g., in the word آخرت (hereafter /axɪrət̪/) is alternatively articulated as /axrət̪/ with the deletion of short vowel /ɪ/ in Urdu speech (Farooq & Mahmood, 2020).

Epenthesis in Urdu

In Urdu speech, the short vowel insertion, mainly /ə/, has commonly been observed as a kind of epenthesis (Farooq & Mahmood, 2020; Farooq & Mumtaz, 2016). Therefore, different pronunciations of a monosyllabic word occur due to the insertion of a phoneme, increasing the number of syllables in a word. So, in an alternative pronunciation, a syllable is a factorable unit of the word associated with the linear string of phonemes in a morphological structure of a word (Akram, 2002).

The same behavior has been observed in the English speech of Urdu speakers in Pakistan. The reason may be the speakers' attitude of overgeneralization and hypercorrection (Hulst, 1979) of Urdu Phonological rules in their English speech. Therefore, phonological variations in English pronunciation have been acoustically investigated after considering Urdu phonological rules' important role. Urdu has sound change rules like other languages (Farooq & Mumtaz, 2016), which is the primary reason for alternative pronunciations of the existing phonetic-scripts of English speech articulated by Pakistani Urdu speakers.

Methodology

This study is based on a hypothesis that Urdu phonological rules directly influence Pakistani Urdu speakers' English pronunciation. This research aims to resolve the issue of mispronunciation versus multiple pronunciations in the English speech of Pakistani Urdu speakers. The British accent is selected as a standard to check the alternative pronunciations. The Oxford English Dictionary has defined mispronunciation as "incorrect or inaccurate pronunciation". The mispronunciation is quite a contentious matter, and there are some definite differences to this extent (Dickson & Andrew, 2018). Currently, this paper has assessed the acoustic behavior of English speech of Pakistani Urdu speakers. The acoustic effect of all the above-mentioned Urdu phonological rules has been analyzed in Pakistani Urdu speakers' English speech. Therefore, the speech data of 30 Urdu speakers have been analyzed to identify their pronunciation. Urdu speakers (male and female both) have been conveniently selected from public sector universities of Pakistan. Their age varies from 18-25 years, and they have completed their undergraduate level education. Therefore, they are supposed to have equal exposure to Urdu and English language. They have been provided with an English script that has covered all phonemes in different phonemic combinations. Afterward, they have recorded their speech at 8000Hz in an anechoic chamber using PRAAT software. Speech segmentation has been done in PRAAT at different tiers, i.e., phoneme, syllable, word, and stress levels (Mumtaz et al., 2014). The International Phonetic Alphabets (IPA) is used to annotate the speech data. The selected vocabulary has multiple instances with the same spellings but with different phonemic alternation, syllable templates, the number of syllables, stress that cause several changes in their speech and pronunciations. The results of data analysis have been shared in section 4 to avoid the vagueness about the variations i.e., (i) speaker-dependent, (ii) context-dependent, or (iii) native language effect. The Oxford English Dictionary is used to incorporate and cross-check the 'standard' pronunciation.

Results

Data analysis has confirmed variations or alternative pronunciations in the English speech corpus of thirty Urdu speakers in Pakistan. Therefore, a wordlist (of 75 words) is compiled; all these words have been observed with multiple pronunciations in our daily life. These words have been selected because they have multiple instances, and these instances have similar spellings but are different either with; (i) phonemic alternation, (ii) syllable templates, (iii) the number of syllables, (iv) stress, and (v) consequently their pronunciations. These words have been recorded in the embedded sentences for avoiding; (i) stress effect, (ii) boundary effect, and (iii) for the confirmation of contextual effect. Later, this speech corpus has been acoustically analyzed in PRAAT software at different tiers (Mumtaz, et al., 2014). The data analysis has confirmed different pronunciations of the selected vocabulary, e.g., the word 'beautiful' (pretty /bjuː.ti.fʊl/) is alternatively articulated as /bɪ.ju:ti:fʊl/, and both pronunciations have same parts of speech (Adj. adjective), but with a different number of syllables (i.e., 3 syllables versus 4 syllables in PakE), stress patterns (i.e., /bjuːti.fʊl'/ verses /bɪ.ju:'ti:fʊl'/) and transcriptions (i.e., /bjuːtifʊl'/ verses /bɪ.ju:'ti:fʊl'/). All these variations have been reported in a log-sheet to reconfirm later for avoiding inconsistency and human errors. The log-sheet has also helped in recalling and reporting the reasons for alternative transcriptions, i.e., (i) annotation errors, (ii) stress patterns, or (iii) multiple pronunciations due to phonemic (a) addition, (b) deletion, or (c) re-syllabification. Moreover, the log-sheet saves time and helps maintain consistency in labeling the speech corpus. Consequently, annotation errors have been ignored and consulted for recording and re-annotation.

The alternative pronunciations of words have been confirmed after comparing their pronunciation with a British accent as a standard; therefore, Oxford Advanced Dictionary was used as a standard. The identified research problem has been proved that Urdu speakers can articulate English vocabulary with alternative pronunciations at different instances and contexts. This research has a more extensive scope and significance for creating relaxation to resolve mispronunciations by considering their English as a Pakistani English (PakE) variety. The speech data has been analyzed, and the results are given in table 1.

Table 1. Acoustic Variation in English Speech of Urdu Speakers in Pakistan

No. of Speakers	Segment Alternation						Vowel Deletion					Consonant Insertion			Vowel Insertion		
	Short Vowel Alternation T=25						Long Vowel alternation	Disyllabic Word Short Vowel T=25		Tri-syllabic Word Short Vowel T=25		Monosyllabic Words with Diphthongs T=25			Monosyllabic Words T=25		
	ə→ɪ	ʊ→ə	ɪ→ə	e→ə	e→ɪ	e→æ	e:→æ:	ə→φ	ɪ→φ	ə→φ	e→φ	/j/	/h/	/v/	before /l/	Before /r/	before /s/ or /z/
SP 1	13	15	10	7	13	24	6	14	24	14	12	15	16	17	17	25	15
SP2	13	15	11	17	12	20	12	22	7	7	9	13	7	7	19	18	25
SP3	24	14	11	11	19	13	22	22	17	17	15	19	17	17	23	22	22
SP4	14	18	12	23	15	13	11	19	11	18	7	18	11	11	20	22	12
SP5	17	22	10	22	11	16	21	12	23	23	17	7	23	23	23	23	24
SP6	18	20	11	12	16	18	18	18	22	22	11	17	21	22	22	22	14
SP7	19	22	13	11	17	10	13	17	12	12	23	11	24	24	19	24	18

SP8	22	20	11	12	15	10	12	22	18	9	17	23	13	23	19	23	19
SP9	5	11	19	14	14	10	14	24	12	15	19	22	18	23	20	25	14
SP10	18	20	11	12	16	18	18	18	22	22	11	17	21	22	22	22	14
SP11	19	22	5	11	17	10	13	17	12	12	23	11	24	24	19	24	18
SP12	17	12	15	22	11	16	21	12	23	23	17	7	12	15	23	23	24
SP13	22	9	13	12	15	5	11	15	18	9	17	23	9	13	22	23	19
SP14	13	15	15	7	13	24	9	13	12	15	12	15	5	11	15	25	15
SP15	13	15	15	17	12	12	15	22	9	13	9	13	7	7	15	5	11
SP16	17	22	20	22	11	9	13	12	22	23	22	7	23	23	20	23	24
SP17	22	12	15	12	15	10	5	11	15	12	15	23	13	23	19	23	19
SP18	17	9	13	22	11	16	21	12	15	5	11	7	23	23	12	15	24
SP19	13	15	10	7	13	24	6	14	20	14	5	11	16	17	9	13	15
SP20	13	15	11	17	12	22	12	12	15	7	9	13	7	12	15	18	25
SP21	22	20	11	12	15	15	12	9	13	9	17	23	13	9	13	23	19
SP22	22	20	12	15	15	15	5	11	18	9	17	23	13	23	12	15	19
SP23	13	15	9	13	13	20	6	14	24	14	12	15	16	17	9	13	15
SP24	13	15	11	17	12	20	12	22	22	7	9	13	7	7	19	5	11
SP25	17	22	10	22	11	16	21	12	15	23	17	7	23	23	23	23	24
SP26	22	20	11	12	15	10	12	22	15	9	17	23	13	23	12	15	19
SP27	13	15	10	7	13	24	6	14	20	14	12	15	16	5	11	13	15
SP28	13	15	11	17	12	20	12	22	7	5	11	13	7	7	19	5	11
SP29	17	12	15	7	11	16	21	9	17	23	13	12	15	7	7	7	33
SP30	15	9	13	9	17	23	13	9	13	22	11	9	13	9	7	27	13
TAPW	496	486	364	421	412	479	393	472	493	427	417	445	446	486	505	564	550

SP = Speaker, TAPW = total alternative pronunciation words

Data analysis and discussion

Data analysis confirms the presence of multiple pronunciations of English vocabulary. These multiple pronunciations have identified and confirmed the presence of three phonological categories: (i) phonemic alternation, (ii) ellipsis, (iii) epenthesis in the English speech of Pakistani speakers. These categories are further divided into several sub-categories discussed subsequently in detail.

Phonemic alternation in English vocabulary

According to the results, Urdu native speakers pronounced multiple pronunciations of English vocabulary in different ways, i.e., (i) substituting one short vowel with another short vowel, (ii) a long vowel to a short vowel, (iii) a long vowel with another long vowel, (iv) a diphthong with a monophthong, (v) a monophthong with a diphthong, (vi) a diphthong breakage by inserting an approximant, and (vii) a consonant with another consonant. A detailed analysis of these phonological variations has been discussed in the following sections.

Vowel alternation

Data analysis has confirmed that the vowel alternation occurs when a vowel is swapped with another vowel. For example, the word 'present' (in British /præzənt/) is articulated in two different ways as; /præzənt/, and /præzænt/, in the English speech of Pakistani Urdu speakers. In these examples, short vowel alternation (i.e., /æ/, /ɪ/, and /ə/) happens at two different levels, i.e. (i) at

the word-initial position, /ɪ/ can be substituted either with a short vowel either /æ/, or /ə/, but (ii) the word medial schwa /ə/ is only substituted with a short vowel /æ/ in the speech files. The first segment alternation is proved speaker-dependent variation, while the second alternation is contextual variation, respectively. Mainly, vowels substitute with a vowel having the same place of articulation, e.g., (i) the short vowel /e/ may alternate with either short vowel [æ, or ɪ], and sometimes even with [ə], while (ii) the short vowel /ʊ/ is only substituted with a short vowel /o/, (iii) but the most important thing is the front vowels cannot replace the back vowels and vice versa. In the English speech of Pakistani Urdu speakers, some common conditions have been observed the phonemic alternations;

1. In this study, phoneme alternation has been observed in all types of word categories;
    (a) Content words
    (b) Functional words
    (c) Monosyllabic words
    (d) Disyllabic words, and
    (e) Multisyllabic words.
2. A short vowel alternates with another short vowel if the word starts with glottalization or syllabic stress. In general, we can write the rule as; A→B /_#[+glottalization] while more specifically as;

(i) e→æ /_#[+glottalization]

$$\begin{bmatrix} +highmid \\ +short \\ -round \end{bmatrix} \rightarrow \begin{bmatrix} +lowmid \\ +short \\ -round \end{bmatrix} \Big/ \underline{\quad} \begin{bmatrix} +syll. \\ \#\text{-back} \end{bmatrix} \text{-back + C.G.}$$

(ii) ʊ→o /_#[+glottalization]

$$\begin{bmatrix} +highmid \\ +short \\ +round \end{bmatrix} \rightarrow \begin{bmatrix} +lowmid \\ +short \\ +round \end{bmatrix} \Big/ \underline{\quad} \begin{bmatrix} +syll. \\ \#\text{+back} \end{bmatrix} \text{+ back + C.G.}$$

3. If a word is articulated with stress, then a short vowel is alternated with another vowel but without changing the place of articulation. Generally, the rule can be written as; A→B /_#[+stress] while more specifically as;

(iii) e→æ /_#[+stress]

$$\begin{bmatrix} +highmid \\ +short \\ -round \end{bmatrix} \rightarrow \begin{bmatrix} +lowmid \\ +short \\ -round \end{bmatrix} \Big/ \underline{\quad} \begin{bmatrix} +syll. \\ \#\text{-back} \end{bmatrix} \text{-back + stress}$$

(iv) ʊ→o /_#[+stress]

$$\begin{bmatrix} +highmid \\ +short \\ +round \end{bmatrix} \rightarrow \begin{bmatrix} +lowmid \\ +short \\ +round \end{bmatrix} \Big/ \underline{\quad} \begin{bmatrix} +syll. \\ \#\text{+back} \end{bmatrix} \text{+ back + stress}$$

4. If the word starts with glottalization or syllabic stress, the long vowel alternates with another long or short vowel. In general, we can write the rule as; A→B /_#[+glottalization] while more specifically as;

(v) e:→æ: /_#[+glottalization]

$$\begin{pmatrix} \text{+highmid} \\ \text{+long} \\ \text{-round} \end{pmatrix} \rightarrow \begin{pmatrix} \text{+lowmid} \\ \text{+long} \\ \text{-round} \end{pmatrix} / \underline{\quad} \begin{pmatrix} \text{+syll.} \\ \text{\#-back} \end{pmatrix} \text{-back + C.G.}$$

(vi) ɔ:➔o: /_#[+glottalization]

$$\begin{pmatrix} \text{+highmid} \\ \text{+long} \\ \text{+round} \end{pmatrix} \rightarrow \begin{pmatrix} \text{+lowmid} \\ \text{+long} \\ \text{+round} \end{pmatrix} / \underline{\quad} \begin{pmatrix} \text{+syll.} \\ \text{\#+back} \end{pmatrix} \text{+ back + C.G.}$$

(vii)   ɔ:/o:➔ʊ /_#[+glottalization]

$$\begin{pmatrix} \text{+mid} \\ \text{+long} \\ \text{+round} \end{pmatrix} \rightarrow \begin{pmatrix} \text{+highmid} \\ \text{-long} \\ \text{+round} \end{pmatrix} / \underline{\quad} \begin{pmatrix} \text{+syll.} \\ \text{\#+back} \end{pmatrix} \text{+ back + C.G.}$$

(viii)   e:➔æ /_#[+glottalization]

$$\begin{pmatrix} \text{+highmid} \\ \text{+long} \\ \text{-round} \end{pmatrix} \rightarrow \begin{pmatrix} \text{+lowmid} \\ \text{-long} \\ \text{-round} \end{pmatrix} / \underline{\quad} \begin{pmatrix} \text{+syll.} \\ \text{\#-back} \end{pmatrix} \text{-back + C.G.}$$

5. If a word is articulated with stress, then a long vowel is alternated with another short or long vowel, but without changing the place of articulation. Generally, the rule can be written as; A➔B /_#[+stress] while more specifically as;

(ix) e:➔æ: /_#[+stress]

$$\begin{pmatrix} \text{+highmid} \\ \text{+long} \\ \text{-round} \end{pmatrix} \rightarrow \begin{pmatrix} \text{+lowmid} \\ \text{+long} \\ \text{-round} \end{pmatrix} / \underline{\quad} \begin{pmatrix} \text{+syll.} \\ \text{\#-back} \end{pmatrix} \text{-back + stress}$$

(x) ɔ:➔o: /_#[+glottalization]

$$\begin{pmatrix} \text{+highmid} \\ \text{+long} \\ \text{+round} \end{pmatrix} \rightarrow \begin{pmatrix} \text{+lowmid} \\ \text{+long} \\ \text{+round} \end{pmatrix} / \underline{\quad} \begin{pmatrix} \text{+syll.} \\ \text{\#+back} \end{pmatrix} \text{+ back + stress}$$

(xi)ɔ:/o:➔ʊ /_#[+glottalization]

$$\begin{pmatrix} \text{+mid} \\ \text{+long} \\ \text{+round} \end{pmatrix} \rightarrow \begin{pmatrix} \text{+highmid} \\ \text{-long} \\ \text{+round} \end{pmatrix} / \underline{\quad} \begin{pmatrix} \text{+syll.} \\ \text{\#+back} \end{pmatrix} \text{+ back + stress}$$

(xii)   e:➔æ /_#[+stress]

$$\begin{pmatrix} \text{+highmid} \\ \text{+long} \\ \text{-round} \end{pmatrix} \rightarrow \begin{pmatrix} \text{+lowmid} \\ \text{-long} \\ \text{-round} \end{pmatrix} / \underline{\quad} \begin{pmatrix} \text{+syll.} \\ \text{\#-back} \end{pmatrix} \text{-back + stress}$$

6.   If a word is articulated with stress, then a diphthong is alternated with another phoneme in two different ways, i.e.,

(xiii)   either substituted a long vowel, e.g., a word 'no' [nəʊ] can be articulated with a monophthong /o:/ by articulating the same word with different pronunciation /no:/

(xiv)   or with a syllable breakage by inserting an approximant, e.g., a word 'really' [rɪəli] is alternatively pronounced in two different ways [re:li], i.e.,

a diphthong is replaced with a long vowel /e:/ and [rejəli], i.e., vowel alternation along with /j/ insertion.

7. Urdu phonological rules also cause consonant alternation, e.g., the word 'thanks' [θæŋks] is alternatively pronounced in two different ways; [tʰæŋks] and [tʰæ̃ks]. [θ] fricative is substituted with /tʲ/ because [θ and ð] phonemes are absent in Urdu inventory; therefore, Pakistani Urdu speakers substituted these sounds with /tʲ/ and /dʰ/ plosives respectively. Vowel nasalization is discussed in the following section (5.2. xv).

Ellipsis in English Vocabulary

According to the data analysis, there is no evidence of vowel deletion in English speech Pakistani Urdu speakers, while consonant deletion has been observed. Different types of consonantal deletions have been reported; (i) /n/ deletion, (ii) /h/ deletion, and (iii) /j/ deletion. The consonantal deletion is not a random choice in the English speech of Pakistani Urdu speakers rather appear only in the following conditions;

8. Consonant deletion always occurs only at word medial and final positions.
9. The consonant deletion converts the preceding short vowel into a long vowel.
10. Deletion of long vowels has not been observed in data analysis.
11. Unstressed articulation also causes a consonant deletion.

   (xv) For example; the word 'plant' [pla:nt] has been articulated as /plã:t/ by converting an oral vowel into a nasal vowel by deleting nasal consonant of the word (Farooq et al., 2020; Farooq & Mumtaz, 2016; Hussain, 2005).

$$\mathbf{n} \rightarrow \mathbf{\phi} / \_\mathbf{[\text{-stressed}]}$$

$$\begin{bmatrix} +\text{nasal} \\ -\text{oral} \\ +\text{voice} \end{bmatrix} \rightarrow \phi / \_ \begin{bmatrix} -\text{stress} \\ -\text{syll.} \end{bmatrix}$$

   (xvi) The word 'oh' [oh] is alternatively articulated as /o:/ by deleting the final position [h] in an unstressed articulation (Farooq & Mumtaz, 2016; Hussain, 2005).

$$\mathbf{h} \rightarrow \mathbf{\phi} / \_\mathbf{[\text{-stressed}]}$$

$$\begin{bmatrix} -\text{voice} \\ +\text{oral} \\ +\text{fricative} \end{bmatrix} \rightarrow \phi / \_ \begin{bmatrix} -\text{stress} \\ +\text{syll.} \end{bmatrix}$$

   (xvii) The word 'beautiful' [bjutɪfʊl] is alternatively articulated with two different pronunciations i.e., [bɪu:tɪfʊl] and [bɪjutɪfʊl (Farooq, Mahmood, & Ali, 2020) (Farooq & Mumtaz, 2016). There is /j/ deletion in the first pronunciation and short vowel /ɪ/ insertion in the second.

$$\mathbf{j} \rightarrow \mathbf{\phi} / \_\mathbf{[\text{-stressed}]}$$

$$\begin{bmatrix} +\text{palatal} \\ +\text{fricative} \\ +\text{voice} \end{bmatrix} \rightarrow \phi / \_ \begin{bmatrix} -\text{stress} \\ -\text{syll.} \end{bmatrix}$$

Epenthesis in English Vocabulary

Data analysis has confirmed that different pronunciations of a monosyllabic word occur due to the insertion of a phoneme, increasing the number of syllables in a word. For example, the word 'film' [fɪlm] is the most commonly articulated as [fɪləm] or [fɪlɪm] with two alternative pronunciations.

Though, [fɪlm] is a standard pronunciation while others are alternative pronunciations with the insertion of short vowels /ə/ and /ɪ/, respectively. These vowel insertions also cause syllabic reformation.

12. Vowel insertion (only short vowel /ə/) takes place after breaking consonant cluster at word medial and final positions in three different contexts;

(xviii) If a bilabial voiced plosive is followed by a liquid sounds /r/ or /l/ e.g., in the breeze, blue, blind, blame, etc.

$$\varphi \rightarrow \text{ə} / \begin{bmatrix} \text{+cont} \\ \text{+bilabial} \\ \text{+plosive} \\ \text{+voiced} \end{bmatrix} \underline{\quad} \begin{bmatrix} \text{-syll.} \\ \text{+son.} \\ \text{+liquid} \end{bmatrix}$$

(xix) if lateral consonant is followed by a bilabial nasal sound /m/ as in the word 'confirm' [kənfərm], it would follow the subsequent rule;

$$\varphi \rightarrow \text{ə} / \begin{bmatrix} \text{+cont.} \\ \text{+lateral} \end{bmatrix} \underline{\quad} \begin{bmatrix} \text{-syll.} \\ \text{+son.} \\ \text{+bilabial} \\ \text{+nasal} \end{bmatrix}$$

(xx) If consonant /sk/ and /st/ consonant clusters occur at the word-initial position, then Pakistani Urdu speakers break the consonant cluster by inserting short vowels either schwa /ə/ or /ɪ/ at word-initial position e.g., in the words; school, scribble, scale, score, scrape, scratch, schedule, stair, step, street, etc.

$$\varphi \rightarrow \text{ə} / \# \begin{bmatrix} \text{+cont.} \\ \text{+son.} \\ \text{-voice} \\ \text{+alveolar} \\ \text{+fricative} \end{bmatrix} \underline{\quad} \begin{bmatrix} \text{-syll.} \\ \text{-son.} \\ \text{+plosive} \\ \text{+ velar} \\ \text{-voice} \end{bmatrix}$$

$$\varphi \rightarrow \text{ə} / \# \begin{bmatrix} \text{+cont.} \\ \text{+son.} \\ \text{-voice} \\ \text{+alveolar} \\ \text{+fricative} \end{bmatrix} \underline{\quad} \begin{bmatrix} \text{-syll.} \\ \text{-son.} \\ \text{+plosive} \\ \text{+alveolar} \\ \text{-voice} \end{bmatrix}$$

$$\varphi \rightarrow \text{ɪ} / \# \begin{bmatrix} \text{+cont.} \\ \text{+son.} \\ \text{-voice} \\ \text{+alveolar} \\ \text{+fricative} \end{bmatrix} \underline{\quad} \begin{bmatrix} \text{-syll.} \\ \text{-son.} \\ \text{+plosive} \\ \text{+ velar} \\ \text{-voice} \end{bmatrix}$$

$$\varphi \rightarrow \text{ɪ} / \# \begin{bmatrix} \text{+cont.} \\ \text{+son.} \\ \text{-voice} \\ \text{+alveolar} \\ \text{+fricative} \end{bmatrix} \underline{\quad} \begin{bmatrix} \text{-syll.} \\ \text{-son.} \\ \text{+plosive} \\ \text{+alveolar} \\ \text{-voice} \end{bmatrix}$$

Conclusion

The speech analysis results have confirmed that Pakistani Urdu speakers have articulated English speech with multiple pronunciations in different contexts and instances. This study will resolve the mispronunciation concept that will give a different English variety as a Pakistani English (PakE) based on their acoustic training. The alternative pronunciation is different from the native British English, but it is a commonly used speaking style that prevails and equally intelligible all over Pakistan. All the rules mentioned above have been reported after analyzing Urdu speakers' English speech in Pakistan. These phonological variations have been observed in; (i) all open and close class words, (ii) unstressed articulation causes consonantal deletion of /h/, /n/, and /j/, (iii) segment deletion in polysyllabic words at word medial and word-final levels, (v) consonant segment deletion may convert a preceding short vowel into long vowel, (vi) vowel deletion is not observed in the speech data. Moreover, (vii) phonemic insertion takes place to break consonant clusters at the word-initial places. Furthermore, (viii) the segmental variation is observed in two different conditions, i.e., (a) stress articulation and (b) prevocalic glottalization. This would ultimately relax the mispronunciation concept and prove effective in accepting alternative pronunciation, i.e., an individual variety as Pakistani English (PakE).

The current reason to discuss alternative pronunciation is to incorporate the language change phenomena as it is necessary to modernize the existing concept of 'standard' English. There is a significant need to develop bilingual dictionaries to report acoustic variations and phonological rules in Pakistani English (PakE). These rules must be acknowledged in L2 learning as a natural acoustic effect of the Urdu language. The variation in pronunciation would not be considered a standard form but must be acknowledged as alternation pronunciation in the Pakistani context. There are so many pronunciation issues that are not discussed here but will be investigated in the future. Moreover, the role of an individual's socio-cultural and educational background will be investigated in the future. Finally, this research has clarified alternative pronunciation that can be accepted as an 'alternative variety' for Urdu speakers in Pakistan. All the observed phonological rules and their acoustic variations were similar among all participants so can be generalized for all Urdu community in Pakistan.

References

Akram, B. 2002. Analysis of Urdu syllabification using Maximal Onset Principle and Sonority Sequence Principle. 160-166. *Center for Research in Urdu Language Processing*.

Crystal, D. 2003. English as a Global Language.

Dickson, and Andrew. 2018. *Oxford English Dictionary*. (Oxford Press) Retrieved January 2021, from Oxford English Dictionary https://www.oed.com/

Farooq, M. 2015. An acoustic phonetic study of six accents of Urdu in Pakistan. Retrieved from https://www.cle.org.pk/Publication/theses/2014/An%20Acoustic%20Phonetic%20Study%20of%20Six%20Accents%20of%20Urdu%20in%20Pakistan.pdf

Farooq, M. 2021. Acoustic effect of indigenous languages on English in Pakistan (unpublished thesis). *Government College University, Faisalabad,* Pakistan.

Farooq, M., and Mahmood, A. M. 2020. Ellipsis in Urdu content words. *Journal of Hamdard Islamicus* 43(S-2 (2020): 1646-1656. Retrieved Jan. 2021 https://hamdardislamicus.com.pk/journal/index.php/hamdardislamicus/issue/view/10

Farooq, M., and Mahmood, M. A. 2020. Epenthesis in Urdu. *Journal of Hamdard Islamicus* 43(1): 771-781. Retrieved Jan. 2021, from https://hamdardislamicus.com.pk/journal/index.php/hamdardislamicus/issue/view/6

Farooq, M., and Mumtaz, B. 2016. Urdu phonological rules in connected speech. *Conference of Lanaguage and Technology.* Lahore: Center for Language Engineering, University of Engineering and Technology, Lahore.

Farooq, M., Mahmood, M. A., and Ali, A. 2020. Re-syllabification and multiple pronunciations in Urdu. *Journal of Al-Qalam* 25(1): 290-310.

Finch, G. 2000. Phonetics and Phonology. In *Linguistic Terms and Concepts*, eds. J. Peck, & M. Coyle, 1(1): 33-76. New York: St. Martin's Press, INC.

Habib, W., Hijab, R., Hussain, S., and Adeeba, F. 2014. Design of speech corpus for open domain Urdu text to speech system using Greedy algorithm. *Conference on Language and Technology.* Karachi, Pakistan.

Hall, C. K. 2005. Defining phonological rules over lexical neighbourhoods: Evidence from Canadian raising. In *Proceeding of the 24th West Coast Conference on Formal Linguistics: Cascadilla Proceedings Project*, eds. J. Alderete, C. -h. Han, & A. Kochetov, 191-199. Somerville MA:Cascadilla Press.

Haq, D. A., Siddiqi, D. A.-u.-L., Sabzvari, D. S., Amrohvi, Naseem, M., and Arif, M. 2013. *Urdu lughat: Tarixi Usuul Per* (3rd ed.), 1-22. Muhit e Urdu Press, Urdu Lughat Board, Karachi. Retrieved from http://udb.gov.pk/

Hulst, H. V. 1979. Rule conversion in phonology. *Dutch Lexicological Institute Leiden*, 336-349. Retrieved from https://www.cle.org.pk/clt16/Presentations/Urdu%20Phonological%20Rules%20in%20Connected%20Speech.pdf

Hulst, H. V.,and Weijer, J. V. 1991. Topics in Turkish phonology. Retrieved from https://harry-van-der-hulst.uconn.edu/wp-content/uploads/sites/1733/2016/05/046-Topics-in-Turkish-Phonology.pdf

Hussain, S. 2005. Phonological processing for Urdu text to speech system. *Localisation in Pakistan, in Localisation Focus: The International Journal for Localisation* 3(4*).*Retrieved from https://www.yumpu.com/en/document/view/30926976/phonological-processing-for-urdu-text-to-speech-system

Jehsen, J. T. 2004. Distinctive features. In *Principles of Generative Phonology*, eds. J. T. Jehsen, & K. E. Korener, 79-106. The Netherlands, USA: John Benjamins Publishing Company,Amsterdam/Phila Delphia.

John, O. J. 1980. The application of phonological universals in speech pathology. *Phonology Laboratory, Department of Linguistics, University of California, Berklay, California*. doi: /10.1016/B978-0-12-608603-4.50009-3

Kahn, D. 1976. Syllable based generalizations in English phonology. Doctoral dissertation, Department of Foreign Literatures and Linguistic, Massachusetts Institute of Technology.

Kirkpatrick, A. 2010. *The Routledge handbook of World Englishes.* London and Newyork: Taylor & Francis Group.

Kreiman, J., Sidtis, D. V., and Gerratt, B. 2014. Defining and measuring voice quality. *Sound to Sense,* 163-168. New York, USA: MIT.

Mendoza, D. R. 2012. *Phonological progresses.* Philippines.

Mumtaz, B., Hussain, A., Hussain, S., Mahmood, A., Bhatti, R., Farooq, M., and Rauf, S. 2014. Multitier annotation of Urdu speech corpus. *5th Conference on Language and Technology.* Karachi.

Murcia, M. C., Brinton, D. M., and Janet, M. 2010. Teaching pronunciation hardback with audio CDs (2) In *A Course Book and Reference Guide* (2nd, illustrated, reprint ed.). Cambridge: Cambridge University Press.

Nawaz, S. 2002. *Deletion rules in Urdu language.* Center for Research in Urdu Language Processing. Lahore: National University of Computers and Emerging Sciences.

Odden, D. 2005. Feature theory. In *Introducing Phonology,* ed. D. Odden, 129-168. Cambridge, NewYork: Cambridge University Press.

Ohala, J. J. 1980. The application of phonological universals in speech pathology. *Speech and Language: Advances in Basic Research and Practice* 3(0-12-608603-6): 75-94.

Panevov, J., and Hana, J. 2010. *Intro to linguistics - Phonology.* 1-5, Retrieved September 28, 2015 https://ufal.mff.cuni.cz/~hana/teaching/2013wi-ling/04-Phonology.pdf

Roach, P. 2009. *English phonetics and phonology: A practical course* (4th ed.). Cambridge: Cambridge University Press.

Saddiqa, A. 2018. The role of Pashto (as L1) and Urdu (as L2) in English language learning, *Linguistics and Literature Review* 4(1): 1-17

Sa'd, S. H. 2018. World English and world Englishes: Perspectives from English language learners in Iran. *Journal of World Languages*, 1-23. doi:10.1080/21698252.2018.1500151

Trigo, P. 2006. LX 513 Phonology. *Hindi (GP)*, 175-76. (A. Grauer, Ed.)

Waqar, A., and Waqar, S. 2002. Identification of diphthongs in Urdu and their acoustic properties. 16-26. Lahore, Pakistan: *Center for Language Engineering, University of Engineering and Technology, Lahore*.

Zia, W. (Ed.). 2011. *Pakistan 6th population and housing census-Pakistan*. Retrieved from http://www.paknetmag.blogspot.com/2011/..../2011-pakistan-6th-population