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ACOUSTIC BEHAVIOR OF ENGLISH TRIPHTHONGS IN PAKISTANI ENGLISH VARIETY

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Abstract

In this research, the acoustic behavior of English triphthongs has been analyzed in Pakistani English (PakE) variety. A triphthong is a gliding movement of three consecutive vowels. According to Roach (2009), majority of English speakers (with BBC pronunciation) perceived few words as monosyllabic vocabulary by identifying triphthongs. English has five triphthongs which are comprised with the combination of closing diphthongs followed by a short vowel schwa (ə). Contrarily, this condition may not compulsory for PakE due to the language variation phenomenon as we know that two diverse languages have different approaches. If there are some similarities in them than consider them just coincidence nothing else. Presently, it has been proposed that the native language, Urdu affects the acoustic behavior of English triphthongs therefore, two different experimental approaches are adopted. In the first step, the auditory approach has used syllable count technique. While in the second step, the identified segments have been acoustically analyzed in PRAAT. After data analysis, the results have reported that Urdu has influenced and transformed the acoustic features of PakE. Therefore, there is no trace of English triphthongs in PakE variety and they are replaced with a monophthong, diphthong or syllabic division.

Key Words: English triphthongs, Pakistani English (PakE), acoustic analysis

1. Introduction

This research is done to deal with the mystery of language change which is faced by a number of non-native English speakers. The lingual participation of non-native English speakers is producing different English varieties. Therefore, it is the need of time to develop standard norms and models for solving the internal variations among different "Englishes". So, the present research is done for the contrastive analysis of speech by identifying acoustic differences in the behavior of English triphthongs in PakE. As, approaching to a native English speaker is a difficult task therefore a list of triphthongs given by Roach (2009, Pp. 19) is used as a reference. Afterwards, two experiments have been performed for the confirmation. In the first experiment, auditory analysis has done for the identification of vocalic differences. In second experiment, acoustic analysis has been done for identifying the

actual changes in PakE. Data analysis has proved the idiosyncratic behavior of PakE as there is no evidence for the existence of English triphthongs because they are substituted with a monophthong, diphthong or syllabic division (e.g. with and without the addition of a consonant /v/ or /j/). If we take an example of a word like 'hour' /aʊə/ a triphthong is articulated either with a monophthong /a:/ or with a syllabic division by inserting /v/ consonant which would increase the number of syllables as well. Two English triphthongs; /aɪə/ and /eɪə/ are pronounced as diphthongs; /aɪ/ and /eə/ respectively. /əʊə/ triphthong always occurs as /o.v.ə/ with vocalic alternation and insertion of /v/ phoneme. Contrary to all other English triphthongs, only /ɔɪə/ triphthong may articulate with three possible variations i.e. (i) a diphthong as /oə/, (ii) with syllable breakage as /o.Ɛ/ or (iii) by vocalic alternation and insertion of /j/ consonant at a same time which would occur as (o.jə).

As Urdu is directly influencing and transforming the acoustic behavior of PakE. Therefore, it would be a positive addition for the acknowledgement of PakE as an independent variety among other "Englishes". It is also true that PakE falls under British Standards but still has differences because a number of factors are responsible for language deviations. Among them, learners' acquisition is a first and primary factor. Secondly, non-native English teachers directly affect English speaking proficiency and thirdly acoustic training of our vocal apparatus is also responsible for these variations. Beside these, we are under the influence of different academic and sociocultural problems. Along with this, we are living in a multilingual country where Urdu is our national language (Rahman, 2006) and mother tongue (Zia, 2011) among other 60 regional languages (Farooq, 2015). But above all of them, English is also considered an official language (Rehman, 2002) because it is playing different roles in economic progress, modern technology, and communication (Kavaliauskiene, 2009) (Mehboob, 2003). English is also declared as a compulsory subject by the education policy in Pakistan (Lewis, Paul, Simons, & Fen, 2016). Therefore, it is the only key to success and stressed for struggling in universal communication and competition for Pakistanies (Romaine, 1994). But it is an ultimate reality that these differences have occurred due to Urdu language interference which proves the hypothesis. As we know that "language is a living organism" which accepts progressive changes (Amberg & Vause, n.d.). Language acquisition and learning are in a close relationship where acquisition is the initiator and learning is playing the role of a monitor for an utterance (Koucka, 2007). Therefore, this relationship is also investigated here which would ultimately prove beneficial for English Language Learning (ELL) in Pakistan.

1.1. Importance of the Problem

In Pakistan, it would be the first research for English triphthongs based on the acoustic analysis of speech. Therefore, it will discuss possible differences and their motivations. Before starting the actual matter of discussion, the purpose behind the research is very important to discuss. Actually, due to the prestige of English as an international language, people have realized the need to learn English for their own benefits (Sharifian, 2004) which becomes the cause of different English varieties. Therefore, it has become an ultimate reason for standardizing different local Englishes by making them independent variety. According to Kachru, local English reflects local cultures and norms therefore he has introduced 'polymodel' of language for categorizing different Englishes (as cited in Kirkpatrick, 2004). Newly emerged English expresses the cultural concept and national struggle of a language community. Although, SLA paradigms have identified language variations as 'negative transfer' on the bases of 'native variety'. But in reality, such varieties would be assessed within their cultures. Because, the language approaches of speakers are psychologically related with their cultures. Actually, in Second Language Learning (SLL), cultural and social horizons of speakers expand but emotional experiences are remained unfeasible. Therefore, the speakers of overlapping varieties share mutual conceptualizations of communication and culture (Ramanujan, 1990). No doubt, English is a global language and is being in contact with a number of different languages. Evidently, almost eighty percent English communication is taking place in non-native countries (Sharifian, 2004) therefore, is progressively changing by different means (Modern Englishes, 2012). The same is the purpose of the current investigation where PakE has been acoustically analyzed by considering the influence of native language, Urdu which is discussed in the subsequent sections.

1.2. Relevant Scholarship

1.2.1. Language Policy in Pakistan

Language plays an important role in learning educational pursuits. Consequently, it is also considered as a strong marker of identity at individual and societal levels. Such role of language was quite obvious during the independence movement of Pakistan. At that time, different languages were used as identity markers for distinguishing the populations of united India. As Urdu was related with Muslims, Hindi with Hindus and Punjabi was tagged with Sikhs (Language Policy, 2010). Therefore, just after the independence of Pakistan in 1947, the

rulers and policy makers had decided Urdu as an official language for maintaining language discrimination across world. But it was also an ultimate reality that English, being the legacy of British rulers was deeply rooted in the high government spheres and all official documentations were in English. Therefore it would be difficult to come without English. For the reason; Urdu and English enjoyed the status of majorly spoken languages despite the fact that both had very limited number of native speakers (Mansoor, 2015). Later, the Constitution of Pakistan 1973, Act 251 (2) had declared English as a second official language "the English language may be used for official purposes until arrangements are made for its replacement by Urdu" (Constitution of Pakistan, 1973), (Article: 251 National language). But fortunately or unfortunately, English language had attained more status than Urdu, the national language. Idara-i-Farogh-i-Qomi Zuban (IFQZ) which is formerly known as National Language Authority (NLA) had also declared Urdu as an official language in 2007. NLA also trained thousands of government employees to use Urdu as an official language. Later, the Senate of Pakistan has proposed the Constitution (Amendment) Bill 2016 with little adjustments. The senate committee was consisted of Senators Sassui Palijo and Mukhtiar Ahmed Dhamrah. The amendment to the clause (1) of Article 251 of the Constitution has proposed to declare "Punjabi, Sindhi, Pashto and Balochi as national languages along with Urdu" (Parekh, 2017) but clause (2) still gives importance to English language as an alternative official language. Therefore, all these decisions and polices have bound the Pakistanies to use Urdu along with English. Resultantly, English articulated by Pakistani speakers has flavor of their first language, Urdu as well.

1.2.2. Influence of First Language on Second Language Learning (SLL)

There is a controversial debate on using first language in Second Language Learning (SLL). Dulay and Burt (1974) have suggested that first language implicitly influences SLL therefore learners are unable to recognize their first language interference. This will ultimately become the reason for variations in second language. Firstly, it has been claimed that non-native speakers should learn second language without using their native language which make them more efficient. Secondly, the other group claimed the importance of first language by giving the reference of Grammar Translation Method, GTM (Tema, n.d.). But it has again a counter attack that Second Language Acquisition (SLA) by first language would create challenging situation for learners. Then, the first group answered that the prohibition of one language and authorizing another would become the reason of nervousness among learners (Amberg & Vause, n.d.). But summing up these arguments, it has been considered that SLA is an organized process where phonological constraints add nativeness flavor in second language (Mahmood, Hussain, & Mahmood, 2011) which has been considered a normal language behavior. The same is the case with Urdu and English as discussed followingly.

1.2.3. Influence of Urdu on English Language Learning

In Pakistan, English is emerging as a "must-have language" due to its significant role in different fields (Mahmood, et al., 2011). According to the Education Policy of Pakistan, it has been declared compulsory element for bilingual education (Mahboob & Jain, 2016). Moreover, Higher Education Commission (HEC) has launched English Language Teaching Reforms (ELTR) program for revolutionizing the existing teaching methodologies by training English language teachers. Consequently, teachers' training would lead towards the achievement of required results. Otherwise, a passive policy without its practical implementations would be useless in reality (Mehboob, 2003).

In Pakistan, according to another research, English language is not only limited with educated people but even uneducated people use few English words in their routine. The reasons might be the influence of class consciousness and media effect. Their vocabulary is not a simple duplication but is a process of a phonological make-up caused by the phonetic constraints of their native languages. Therefore, the resultant variations ultimately cause multiple pronunciations and language change (Riaz, 2015). Pakistani English literature has also added "Urduised" vocabulary which directly influences PakE by adding new lexical items. This vocabulary reveals distinctive and indigenous Pakistani culture. It also bridges localization by representing independent linguistic norms which ultimately makes PakE an independent English variety among other Englishes (Ahmad & Ali , 2014). These researches have reported the nativeness effect of Urdu language on Standard English which pays way to an autonomous variety as Pakistani English (PakE).

1.2.4. Pakistani English (PakE)

Linguistic differences are obvious reasons for the dialectal variations in PakE (Schneider, 2010). In fact, first language defines the regional dialects of an English variety in a specific country. We know that Pakistan is a multilingual country and has more than 60 different spoken languages (Farooq, 2015) which would further cause

possible dialectal variations in PakE. Since, people are users of at least two different languages at a time therefore, phonological variations may occur due to; (i) social contact, (ii) language interaction, (iii) geographical shifting, (iv) gender differences, (v) educational variations, etc. (Mahboob & Szenes, 2010). PakE has identified different variations of phonology, syntax, morphology and even in semantics but this paper deals with the phonological variations only. Phonologically, it is different for having distinctive consonantal and vocalic features (Khan, 2012). Urdu has influenced PakE with vowel substitution and alternations (Hussain, Mahmood, & Mahmood, 2011) which are briefly discussed in the following sections.

Kachru (2005) has claimed that PakE speakers are unable to maintain distinction between long /iː/ and a short /ɪ/ vowel, along with /e/ or /æ/ vowel but these claims have been refused later (Bilal, Mahmood, & Saleem, 2011b) (Bilal, Mahmood, & Saleem, 2011a). Another research has claimed that PakE speakers could not maintain difference between /ɜː/ and /ə/ vowel because /ɜː/ sound is unavailable (Mahboob & Ahmar, 2004) in Urdu and Punjabi phonetic inventory (Hussain, et al., 2011), (Bilal, Mahmood, & Saleem, 2011c). PakE belongs with outer circle Englishes where full vowel articulation is a shared tendency and vowel reduction is not possible even in unstressed speech articulation (Crystal, 2003). Although, such phonological patterns are different from RP but would be identified as one possible standard variety. Then, non-native English teachers ultimately would continue their norms of pronunciation with self-confidence (Kirkpatrick, 2007) and would believe English as their own language as it belongs to anyone else (Deterding, 2010). This principle supports current research; the language nativity affects the acoustic differences by causing alternative pronunciation in RP phonetic inventory.

1.2.5. Phonetic Inventory

Every spoken language has a phonetic inventory which is comprised of different consonants, vowels, monophthongs, diphthongs, triphthongs, etc. (Skandera & Burleigh, 2005) (Roach, 2009). The consonants are articulated with the stoppage of air stream in oral or nasal tract. Air constriction in a specific place would occur with the consonants of respective name e.g. bilabial, glottal, dentals, etc. Vowels are pronounced without air obstruction and phonologically occupy central position in a syllable. They are considered as essential speech segments because sound quality is dependent to the frequency, loudness, intensity, and pitch of vowels (Roach, 2009).

Monophthong is also a kind of vocalic sound but has no independent phonetic symbol therefore represented by using vowel symbols. A monophthong sound remains fixed in a vowel therefore is called "*monophthonggos"* but is segmentally larger than a vowel which may be sometimes equal to a diphthong. Moreover, it shows divergence from a diphthong or triphthong. The transformation of a monophthong to a diphthong and vice versa is an important feature in language change phenomenon (Mahajan, 2014) which is called diphthongization process (Kohnlein, n.d.).

It seems there is no apparent consensus for the phonetic definition of diphthongs. But the most consistent definition tells that it is a combination of two vowels which has dual targets and transition period. They have no separate phonetic symbols therefore used same vowel IDs in transcription. There are eight RP diphthongs which show the quality of one vowel initially then another vowel property at final position. Therefore, these sequences are also known as *vowel glides*, *gliding vowels*, or *diphthongs* [derived from Greek word *"diphthonggos"* means 'double sound']. There are three types of diphthongs: (i) *centering,* (ii) *closing* and (iii) *opening* (Lee, Potamianos, & Narayanan, 2014). According to Roach (2009), RP diphthongs are divided in such a way;

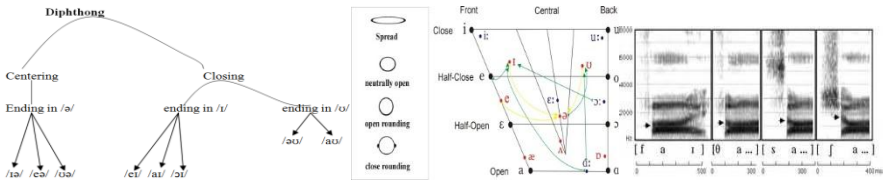

Figure 1: RP Diphthongs

Another categorization has divided them as *ascending diphthongs* and *descending diphthongs* but all RP diphthongs are descending in manner. Acoustically, a diphthong is identified with the formant frequencies (F1, F2, F3, etc.) of both vowels from the onset to the offset position but F2 is more significant among all frequencies. Because the transition rate of F2 always differs for each diphthong therefore it proves a discriminating parameter (Lee et al., 2014).

A triphthong deals with the three vowels within one syllable. If there are one vowel sound in a syllable that would be a vowel or monophthong, in case of two different vowel sounds in a syllable it is a diphthong and three distinctive vowel sounds in a syllable, would be known as a triphthong. By considering the length; monophthong, diphthong or triphthong is almost similar to each other. But has no independent phonetic symbol therefore used the vowel symbols without any duration mark. It's also an ultimate reality that a rhotic dialect has no triphthong and sometimes diphthongs are also absent (The Phonology of English Vowels: An Introduction). The conventional vowel sequences consist of three vowel sounds called triphthongs [derived from Greek word "*triphthonggos"* means 'triple sound']. Different languages have different number of triphthongs e.g. Romanian has two triphthongs and Bernese German, Northern Bavarian, Portuguese, Spanish have four triphthongs but Vietnamese has eight triphthongs (Wells J. C., 1982b) while English has five triphthongs i.e. /aɪə/, /eɪə/, /ɔɪə/, /aʊə/, and /əʊə/ which are the combination of closing diphthongs followed by schwa /ə/ vowel. The existence of a triphthong is controversial phenomenon in RP (BBC) pronunciation because neither dictionary nor any linguist has claimed its presence except

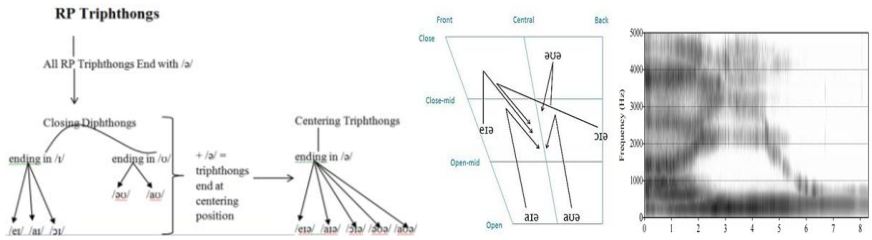

Figure 2: English Triphthongs[1]

Roach. As he has claimed the possible existence of two triphthongs in the pronunciation of "words such as 'fire' /faɪə/ or 'hour' /aʊə/ are probably felt by most English speakers (with BBC pronunciation) to consist of only one syllable, whereas 'player' /pleɪə/ or 'slower' /sləʊə/ are more likely to be heard as two syllables" (Roach, 2009, Pp. 19, Para 2). According to him, the reason not to discuss triphthongs in detail "because there is no much variation in the amount of vowel movement according to how slow and careful the pronunciation is and also because the "careful" pronunciation can be found by looking at the description of the corresponding diphthong and adding /ə/ to the end" (Roach, 2009, Pp. 19, Para 3).

Finally, we can say that English is globally a universal language and is required for the improvement in life. Therefore, it has been used by a large number of non-native people for individual and national excel. Consequently, non-native speakers add nativeness effect at different levels of second language where the process may be conscious or unconscious. Among them, phonological variation is the most prominent level in their speech which confirms that every spoken language has its own inventory. Vowels are significant speech segments because speech quality is vowel dependent. Triphthong is an important and complicated vocalic segment. There are five triphthongs in English but the review of literature has refused the presence of English triphthongs and confirmed the presence of alternative phonemic segments in PakE which would be enquired in subsequent sections.

1.3. Research Hypothesis

The hypothesis of the research is whether the first language, Urdu will affect Pakistani English or not? Therefore, it will answer the following questions;

a. Is there any English triphthong in PakE variety?
b. If yes, how many in number they are?
c. What is their acoustic behavior?

2. Method

2.1. Participants Characteristics

By using convenience sampling method, 30 Pakistani English speakers have been selected as a research sample. Among them 12 are male and 18 are females and their age ranges from 18-25 years. All of them are not professional vocalists but are graduates of different Public Sector Universities. The first purpose behind the selection is their

[1] http://www.phonologythree.blogspot.com
http://www.fon.hum.uva.nl/paul/papers/AcousticAnalysis8.pdf

good comprehension for English language. Secondly, a graduate is considered an individual equally attached with his mother tongue and second language, English.

2.2. Research Design

The research is epistemological in nature and directly relates with positivism as results have been acquired by means of scientific methodologies. Accordingly, the area of acoustic-phonetics is selected for contrastive analysis of English triphthongs in PakE variety. The purpose of the study is to investigate whether the native language, Urdu phonetically influences PakE or not.

2.3. Experimental Manipulations

Afterwards, their speeches have been recorded and acoustically analyzed in PRAAT software (Boersma & Weenink, 1992-2013). PRAAT is used for analyzing, synthesizing and manipulating speech sounds by visualizing their possible variations (Boersma, 2013). So, the list of words which is comprised of English triphthongs (suggested by Roach) has been selected for constructing a text corpus (of 10 sentences) which has been used for recordings. The speech is recorded in anechoic chamber at sampling rate of 48000 Hz in PRAAT package by using high fidelity microphone, headphone and amplifier. Their speech is served for developing annotated speech corpus and used as research data for the acoustic analysis. Therefore, this speech corpus has been phonologically annotated with the help of Case Insensitive Speech Assessment Method of Phonetic Alphabets, CISAMPA (Mumtaz et al, 2014). The speech annotation has been done manually in order to avoid ambiguities and machine errors. Therefore, each vocalic segment is physically analyzed after measuring its segmental differences i.e. durations, alternation, formant frequencies, etc. Afterwards the physical properties and unique acoustic behavior of PakE have been reported.

3. Results

Spectral analysis of wave form is not enough for the measurement of triphthongs therefore spectrogram is being used. The reason is the variable frequency which changes with the time. In that way, it follows the processing format of basilar membrane in the inner ear which divides the sound in frequency at every interval of time. Due to the effect of pitch, there occurs a problem of sound consistency therefore a spectrum cannot be analyzed for a single moment in time. Instead of this, we can suppose that a spectral property of a sound remains stable for at least 5 milliseconds afterwards determine the spectrum of each slice separately. Such a short span window of 5 milliseconds is called *"broadband spectrogram"* where time increases with horizontal axis and frequency increases with vertical axis.

Formant analysis is also useful for the identification by using source filter theory where source is the vibration of vocal cords and filter is the vocal tract resonance. For enhancing reliability, multiple measurements would be taken afterwards median of measured values has taken in order to minimize the influence of gross measurement errors (Boersma, 2013). *Duration* is another property of phonemic segments in context of time and timing in speech production. The reason is vowels are directly affected in duration with a number of factors e.g. adjacent consonants, speaking rate, syllabic stress, numbers of syllables in a word, vowel's position in a phrase, word type, and emphasis assigned to the word by a speaker. Gliding segments or triphthongs follow similar rules (Khurshid, Usman and Javaid, 2003-2004). The current research is a comparative study for identifying acoustic behavior of English triphthongs in the speech of Pakistani English speakers. The whole analysis is divided in two steps; (i) auditory experimentation and (ii) acoustic experimentation.

3.1. Auditory Experimentation

Auditory experimentation is based on the listening skills of the linguists. The selected English text has been asked to record by 30 Pakistani English speakers for the verification of hypothesis. The used text has five triphthongs (10 sentences x 5 vocalic segments x 3 repetitions x 30 speakers = 4500 utterances). Earlier, the text has been recorded in connected speech but in order to confirm the results every speaker has been asked to articulate each word three times in a carrier phrase. Later these recordings have been given to two linguists for the identification of gliding segments after listening. For this purpose, a checklist has also been constructed for syllable count in a word because it is a good hint (Bhatti & Mumtaz, 2016) for the identification of triphthongs.

In pilot testing, listening comprehension of a linguist has been tested for getting better results. Therefore, confusing words are also included in audio test files. After getting the consensus, the actual experimentation has been started. Words (containing triphthongs) have been recorded at initial, medial and final positions. Respondents have listened all these recordings very carefully after counting the number of syllables in a word. By considering this syllable count log-sheet, the idiosyncratic acoustic behavior of PakE has been identified. The initial results reported that in Pakistani English, there are no English triphthongs which are suggested by Roach (2009). But they

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are replaced either with a monophthong (/a:/), diphthong (/aɪ/ and /eə/), with vocalic alternation either with or without segmental insertion of /v/ and /j/ consonants.

Table 1: The Checklist for Auditory Analysis

		Phonological Transcription	No. of Syllables	Identification	Insertion
1	player, mayor	/eɪə/ → (eə)	1	Diphthong	
2	lower, widower	/əʊə/ → (o.v.ə)	2	Disyllabic	/v/ insertion
3	Fire, tired	/aɪə/ → (aɪ)	1	Diphthong	
4	hour/our, power	/aʊə/ → (a.v.ə)	2	Disyllabic	/v/ insertion
		/aʊə/ → (a:)	1	Monophthong	
5	loyal, royal	/ɔɪə/ → (o.jə)	2	Disyllabic	/j/ insertion
		/ɔɪə/ → (oə) (not in IPA)	1	Diphthong	
		/ɔɪə/ → (o.Ɛ)	2	Disyllabic	

3.2. Acoustic Experimentation

Afterwards, acoustic analysis has been done which confirmed PakE as a different variety. The spectral analysis shows that there is no triphthong articulated by Pakistani English speakers but pronounced with alternative vocalic segments. For example, /aʊə/ English triphthong is substituted either with /a:/ monophthong or medial vowel /ʊ/ is replaced with consonantal phoneme /v/ which would convert a monosyllabic word into a disyllabic word. Two triphthongs; /eɪə/ and /aɪə/ are pronounced as diphthongs; /eə/ and /aɪ/ respectively. The triphthong /əʊə/ has always articulated as /o.v.ə/ by converting /ə/ into a long vowel /o/ and medial vowel /ʊ/ is substituted with /v/ consonant and these alternations ultimately would convert a monosyllabic word into a disyllabic word. Contrary to all these triphthongs, only /ɔɪə/ triphthong may be articulated as (i) a diphthong (oə), (ii) syllable breakage without insertion (o.Ɛ) or (iii) with the insertion of /j/ consonant (o.jə).

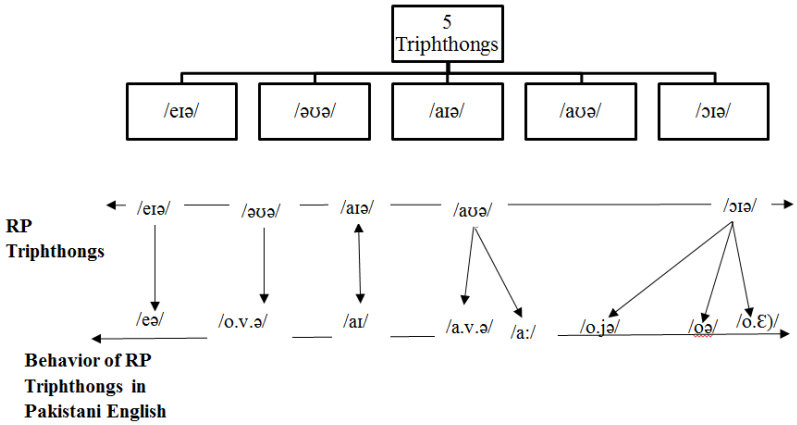

Figure 3: Acoustic Behavior of English Triphthongs in Pakistani English

4. Discussion

Segmental duration and formant frequencies have been analyzed at a normal speaking rate. Average values have been taken by enlisting their values among male and female Pakistani English speakers which have been enlisted in table. Firstly, vocalic segments are selected or rejected on the bases of duration.

1. A monophthong is different from an ordinary vowel by the means of duration as it has more duration than an ordinary vowel. This hypothesis also supports the segmental duration in the present study as well. For example, the average durational range for an unstressed vowel is between 100-120 milliseconds while a monophthong ranges from 150-170 milliseconds.
2. All unstressed diphthongs have segmental duration around 300 milliseconds (or below). This duration also supported in the past researches of Pakistani English diphthongs (Farooq & Mahmood, 2017) and Pakistani Urdu diphthongs (Khurshid, Usman, & Javaid, 2003-2004) (Bhatti & Mumtaz, 2016).

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Table 2: Vocalic Sequences and their Duration in PakE

	Acoustic Behavior of English Triphthongs in Pakistani English	Average of Unstressed Articulation (ms.)	
		Male	Female
1	/eɪə/ → (eə)	151	154
2	/əʊə/ → (o.v.ə)	293	305
3	/aɪə/ → (aɪ)	164	159
4	/aʊə/ → (a.v.ə)	257	298
	/aʊə/ → (a:)	134	150
5	/ɔɪə/ → (o.jə)	257	259
	/ɔɪə/ → (oə)	139	170
	/ɔɪə/ → (o.Ɛ)	166	189

The highlighted rows are not gliding segments therefore have more duration than the monophthong or diphthongs so will not analyzed further.

Formant frequencies of identified vocalic segments (i.e. one monophthong and three diphthongs) have been manually measured in PRAAT. Therefore, first formant (F1) and second formant (F2) have been measured while remaining formants (i.e. F3, F4, F5) are ignored as they are not much supportive like first two formants. A diphthong has been divided into three parts i.e. on glide, transition period and off glide. Presently, transition period has been used for the acoustic identification. Three instances of every vocalic segment (10 sentences x 5 vocalic segments x 3 repetitions x 30 speakers = 4500 utterances) have been measured and their average values are reported in the following table.

Table 3: Vocalic Segments and their Formant Frequencies in PakE

	Vocalic segments	Average Formant Values of Males' Vocalic Segments (ms.)		Average Formant Values of Females' Vocalic Segments (ms.)	
		F1	F2	F1	F2
1	aɪ	680	1502	593	1739
2	eə	546	1712	438	1864
3	oə	753	1453	779	1700
4	a:	576	1200	650	1408

Places and manners of articulation of three diphthongs in PakE are displayed in the figure 5 by using the above mentioned values.

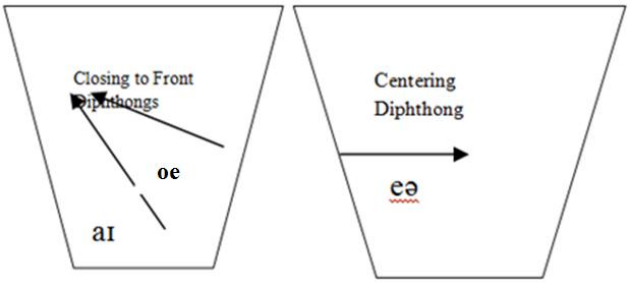

Figure 4: Places and Manners of Articulation of Diphthongs in PakE

In Pakistan, Urdu is our national language but English is also considered an official language. Obviously, English should be our second language but fortunately or unfortunately, is rewarded more than the native languages. Therefore, in this study, the speech of Pakistani English speakers is acoustically analyzed in PRAAT software and results have confirmed that there are number of differences in native English and Pakistani English variety.

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1. There is no English triphthong in PakE but are articulated with alternative vocalic segments by showing different acoustic behavior.
2. Pakistani speakers are articulating vocalic segment with segmental lengthening without creating vowel reduction. Therefore, monophthong is articulated in place of English triphthong e.g. in articulating the word 'power' /a:/ monophthong is articulated by Pakistani speakers in place of /aʊə/ triphthong.

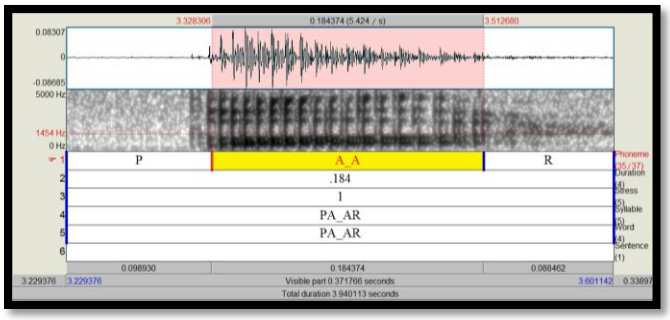

Figure 5: Monophthong in PakE

3. In the present study, only three diphthongs are confirmed by using auditory and acoustic methods.
4. But all these diphthongs are identified at word medial and final positions only. The reasons might be; the nativeness effect of Urdu language.

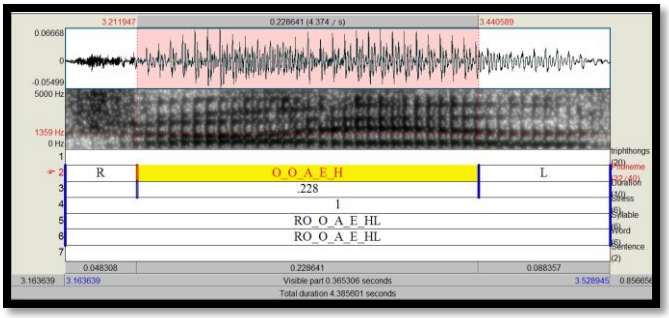

Figure 6: Diphthong in PakE

5. In English triphthongs, medial vowel loses its properties due to the influence of surrounding vowels. In PakE, in the word 'hour' /aʊə/ medial vowel /ʊ/ is replaced with a consonantal segment /v/ which would convert a monosyllabic word into a disyllabic word by increasing its number of syllables.

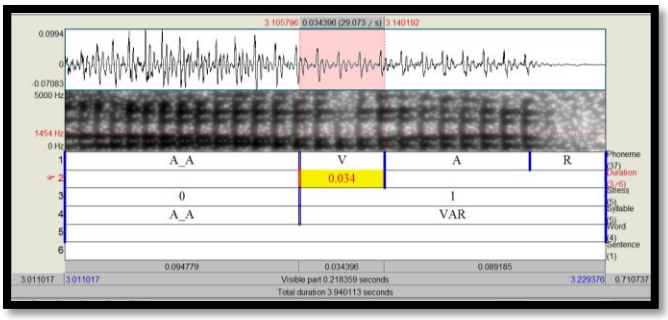

Figure 7: Consonantal Insertion

The results of data analysis have concluded that there is no English triphthong in Pakistani English variety. The reason is the nativeness effect of Urdu language where no vocalic reduction is possible even in unstressed articulation. On the other hand, we Pakistanies, being a non-native speaker are more conscious in oral presentation

and consciousness also causes the full articulation of vowels and ultimately would not articulate triphthongs (1.2.3.). The present work has confirmed the contrastive nature and acoustic differences in PakE. It also confirms that native language, Urdu phonologically influences English speech of Pakistani L2 speakers. This effects the word syllabification, vowel duration and formant frequencies of vocalic segments and confirms the absence of all English triphthongs in PakE. These results are based on the data collected from thirty speakers. PakE speakers have not been articulated short vowels at word final position due to the extra metrical rule and the nativeness effect of Urdu language. Consequently, we can say that PakE would become an independent variety with the addition of these vocalic segments.

Acoustically, Pakistani English is different from British English. The study will also helpful for English Language Learning (ELL) in Pakistan. But the research is presently limited to the minimum number of speakers and research data. Therefore, following steps would be taken in future by increasing the number of speakers and corpus which would definitely enhance objectivity of the research. Accent variation would also be investigated in future by collecting speech corpus from different language speakers. For knowing the causes of accent variation phonological rules would be acknowledged in future.

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