Phonemic Description of the Six Major Sub-varieties of Pakistani English

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Key Words	Abstract
- Sub-variety, - Standard British English, - Pakistani English, - phonemic inventory, - phonemic comparison, - phonological analysis	*English, a non-native variety, is the official and most prestigious language in Pakistan. This variety is now accepted and referred to as 'Pakistani English' PE. However, PE is not a single variety, but a group of localized varieties shaped and influenced by the local languages. Having typical and marked characteristics, these varieties can be referred to as the localized sub-varieties of PE. The purpose of the present study is to carry out phonological analysis of phonemes of the sub-varieties of PE focusing on them as different varieties of English and not as inferior or impoverished English. Following endo-normative standards, this study not only finds out the phonemic differences but also conducts a phonemic comparison of these sub-varieties with Standard British English SBE. First, it accounts for the variation in phonemes of the sub-varieties. Secondly, it has explained which speech segments of SBE are influenced in Pakistan by the six major local languages. Thirdly, it investigates the transfer-based phonetic reshaping of SBE phonemes. Fourthly, the phonemic inventories of the sub-varieties have been developed. It is a descriptive study which involves both qualitative and quantitative scales in the course of analysis. Sample data was accessed from the English non-native speakers of the six major languages of Pakistan. Data was collected by employing Wells' framework for vowels, and a list of carefully selected words for consonants aiming at elicitation of the data through recordings from the natives speaking standard varieties of each language with equal number of samples of Urdu, Punjabi, Saraiki, Sindhi, Balochi, Pashto, who speak English as second or third language. The results show that there are variations in both vowels and consonants. There are at least ten basic vowels and twenty-two consonants in each of these sub-varieties. Various difference were realized in plosives, fricatives, liquids, glides, and nasals.*

1. Introduction

The realization of English as a different variety in its structure due to its use in Pakistan is surely not odd as Mahboob (2014) notes that English can be at variance along three dimensions (a) users (b) uses (c) mode of communication. Referring to Rahman (2003), and Gargesh (2006) claim that Pakistan has six major as well as fifty-nine minor languages, while the government looks on Urdu and English with favor. Urdu is regarded as an identity marker with approximately eight percent natives whereas English is the marker of modernity.

Besides, as the official language, English has always been a prestigious and prominent language in Pakistan (Mahboob & Ahmar, 2004). Currently, Pakistan has 17 million users of English as L1 and 145 million users of English language as L2 (Jenkins, 2003). However, due to its remarkable differences in the ways British English (BE) is used in Pakistan, researchers (Rahman, 1990; Baumgardner, 1991; McArthur, 1992; Mahboob & Ahmar, 2004) refer to it *Pakistani English* which got recognized in 1980s (Hashmi, 1987) and started receiving formal study by the end of 20th century (Baumgardner, 1991). Pakistan, however, is a multilingual and multiethnic country. This consolidates the fact of existences of sub-varieties within PE. Since English varieties so far have been represented only at the state level (e.g. Indian English, Bangladeshi English), therefore, there is need that they must also be explored further for the identification of sub-varieties within varieties (Seargent, 2012) of English in multilingual states like Pakistan.

This study focused on the phonemic system of sub-varieties of PE as different varieties of English and not as inferior or impoverished forms of English. Accordingly, it follows endo-normative standards in the course of phonological exploration of these sub-varieties. In the area of phonology, it delineates the phonology of the sub-varieties at the segmental levels. The aim is to find out the phonemic differences between SBE and the sub-varieties of PE. This study, by comparison, is a regional study of speech sounds of Urdu English (Ur-E), Punjabi English (Pun-E), Saraiki English (Sar-E), Sindhi English (Sin-E), Balochi English (Bal-E, and Pashto English (Pash-E).

Relating to this, it can be hypothesized that the existence of varieties or sub-varieties can ultimately be traced back to influence – which is termed as *interference* linguistically speaking – from L1s of speakers or users. Thus, this can also follow that Pun-E is the largest sub-variety of PE as Punjabi, being the language of half of the country (Baldi, 2008), outnumbers other 72 languages spoken in Pakistan.

The main questions of this study are:

  i. What are the phonemic differences between SBE and sub-varieties of PE?

  ii. What are the phonemic inventories of the sub-varieties of PE?

The purpose of this research is to find out the variation between phonemes of English and represent them as the phonemes of the sub-varieties. Thus, it intends to explore the differences of phonemes –vowels and consonants – between the sub-varieties and British Standard English to develop the phonological inventories of these sub-varieties.

The theoretical as well as practical implications of this study involve that, firstly, it would allow English learners and students from Pakistan to find out the areas of pronunciation where they need to make improvement in order to be the good, clear and articulate speakers

of English. They would brim with self-assurance and confidence and will not have the fear of impoverished English on their part. The hindrances in the area of pronunciation that forbid an effective communication between Pakistani speakers of English and speakers of SBE will be easy to diagnose and troubleshoot. Secondly, the study marks the targeted areas pointing out the mistakes of PE speakers. It will also provide them ease for improvement in better understanding and skillful use of spoken English nationally and internationally by increasing the level of intelligibility. Thirdly, the comparison between the sub-varieties of Pakistani English and SBE would account for the differences and help the PE speakers. It would provide an understanding of speech sounds of PE that has a different sound system than other varieties of English. Fourthly, the results would be relevant and important to the teaching point of view in Pakistan where correct English reading and teaching has been a solid issue for teachers.

2. Literature Review

Among language, dialect and variety, variety is an umbrella term which refers to "any distinct form of a language" (Seargeant, 2012). Wells (as cited in Bauer, 2002) gave a classification model which accounts for the existence of pronunciation difference between varieties in terms of (a) phonetic realization, (b) phonotactic distribution, (c) phonemic system, (d) lexical distribution.

Variation occurs in the core components of a language when it is taken up by other communities, cultures or situations (Anwar, 2007) and, then, such language is considered as a transplanted language. According to Baumgardner (1995), PE is the transplanted and one of the new English varieties like Indian and Singapore English. At the time when Baumgardner (1995) did research on PE, it was just the beginning when researchers had just started to think about PE as a different variety. Rahman (1990) argues that different native languages of people in Pakistan influence English. In his study, he presents four sub-varieties as sociolects and termed them Anglicized English (Rehman, 1990), acrolect, mesolect, and basilect (Bussmann, 1996). Compared to other varieties of English such as Indian English, many researchers on PE (i.e. Mahmood, Asghar, and Jabeen, 2011; Bilal, Warraich, Fatima, Tiwana, and Bhatti, 2012; Shabbir, Tariq, Bilal, Nazar, and Rafiq, 2013) agree that it is not much explored yet. At least not much has been explored specially in the area of phonology (Mahboob & Ahmar, 2004).

According to McArthur's Wheel Model (as cited in Bauer, 2002; Sedlatschek, 2009), PE comes in the outermost circle. Mahboob and Ahmar (2004) consider PE heterogeneous because of the speakers with different mother tongues. They note that PE speakers' L1s have influence on the way English is pronounced by them. For example, there is epenthesis of schwa in English of Punjabi and Urdu speakers.
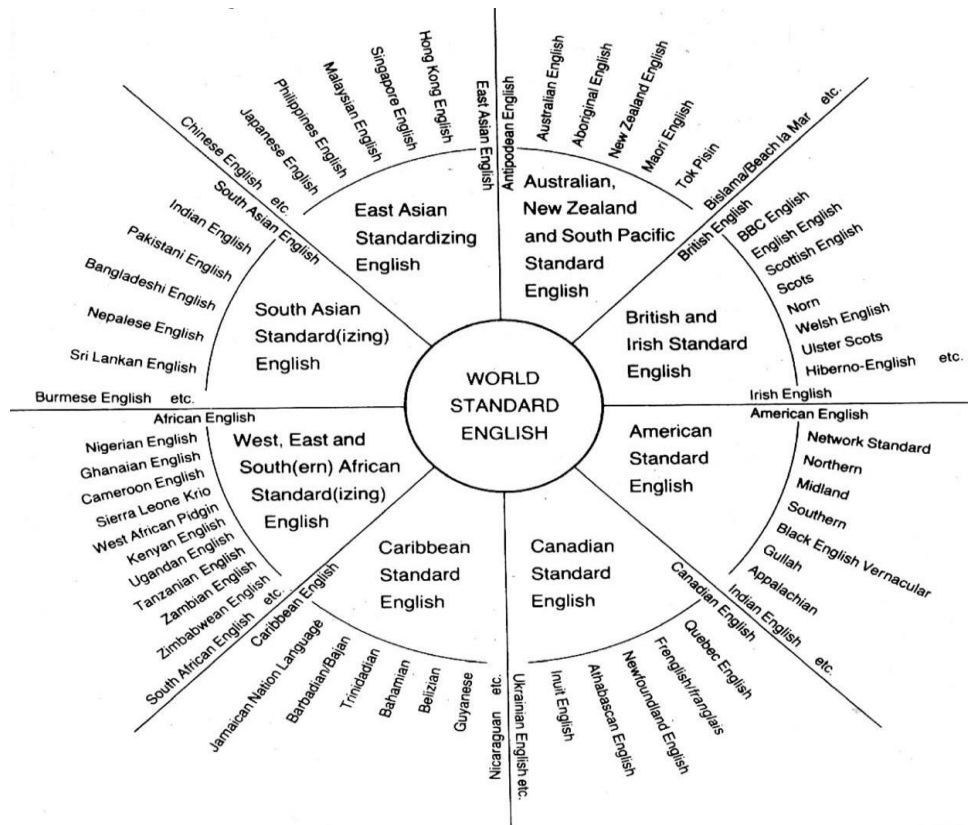
Figure.1: Tom MacArthur's Wheel Model of World Englishes

(as cited in Bauer, 2002; Sedlatschek, 2009)

Some of the initiative studies focus on restructuring in monophthongs. For example, Rahman (1991) argues that monophthongisation is also common in PE. For instance, he refers to the change of RP /aʊ/ and /eɪ/ to /o:/ and /e:/ respectively. Whereas, for Mesthrie and Bhatt (2008), the diphthongs /eɪ/, /aɪ/, /aʊ/, /ɔɪ/, /o:/, /eə/ or /əɪ/, /ɪə/, and /ʊə/ are found in PE. The unstressed vowel /ɪ/ is found as the last vowel of *happy* and *horses*. The last vowel in *letter* and *comma* is perceived as /ʌ/ (Mesthrie & Bhatt, 2008). Other recent studies focus on restructuring in vowels. For instance, Jabeen, Mahmood, and Asghar (2012) examine vowel epenthesis in PE and found that epenthesis is a significant feature in PE. They find that epenthesis exists regardless of position in PE. Similarly, Sheikh (2012) examines the vowels of PE and found out various variations in the vowel phonemes. She argues that, as a phonological feature, restructuring in vowels is dominant than restructuring in consonants in new varieties. She notes that most phonemes in PE match RP. Notably, she found variation in the realization of /e/, /ɒ/, /ɔ:/, /ʌ/, /ɜ:/ whereas /e/, /æ/, /ɒ/, /ɜ/, /ə/ need restructuring with respect to Urdu vowels as they do not exist in Urdu. Rahman (1991) also noted that /ɒ/ and /ɔ:/ are replaced by /ɑ:/. As in some Asian varieties of English /i:/ and /ɪ/ are merged, therefore, Saleem, Mahmood, and Bilal (2011) studied this phenomenon of distinctiveness of /i:/ and /ɪ/ in PE and found out that these two vowels have the difference both in quality and quantity.

Mahboob and Ahmar (2004) lable PE as a rhotic variety because /r/ is pronounced unconditionally at all positions in words. They also agree about the retroflexation of alveolar stops and further note that there is no distinction in /v/ and /w/ in PE. On other hand, according to Rahman (1990), speakers of English with Pashto as L1 do not produce /v/ when it occurs at the end of a word. Dental Voiceless plosives /p/, /k/, /t/ are commonly unaspirated in PE (Rahman, 1991; Mahboob and Ahmar, 2004, 1013; Mesthrie & Bhatt, 2008). Dental fricatives are realized as [t̪], [d̪] (Rahman, 1991). Mahboob and Ahmar (2004) also highlight this phenomenon as dentalisation of fricatives /θ/, /ð/. /h/ can be voiced or murmured in PE. /n/ is made retroflex before /t/, /d/ in PE. Besides, PE is the rhotic variety (Mesthrie & Bhatt, 2008).

Afsar and Kamran (2011) explored the consonants of PE and compared them with Standard BE. They note the inventorial, realization, incidental and distributional differences between consonants of both. In inventorial differences, they suggest that PE makes use of /ʋ/ instead of /w/, and /ʒ/ is replaced by /j/ or /z/. In realizational differences, they note lack of aspiration, non-velarized /l/, flapping of /t/ at word-final position. They observed the use of dental plosives /t̪ʰ/, /d̪/ instead of dental fricatives /θ/, /ð/ in PE. They also describe the incidental differences such as the use of /s/ in place of /z/, and /gz/ instead of /ks/. Further, they also found distributional differences due to the phonetic context of segments such as the use of /d/ instead of /t/ in words where /d/ becomes /t/ if it is preceded by a voiceless consonant, and the use of /ŋk/, /ŋg/ instead of /ŋ/.

According to Gargesh (as cited in Shabbir et al., 2013), the dental fricatives /θ/, /ð/ are restructured to [t̪ʰ], [d̪] in PE. To find out the deviation, Mahmood et al. (2011) have done the acoustic Analysis of dental fricatives /θ/ and /ð/ in PE by comparing it with RP. Their research was more scientific in nature as compared to that of others on PE. According to their findings, RP dental fricatives /θ/ /ð/ are different in PE and more like Urdu [t̪ʰ], [d̪]. Dental fricatives in PE exhibit the same place but differ in manner. Subsequently, they have no alternate in Urdu and have been restructured. They have recommended to acknowledge them as dental plosives instead of dental fricatives.

With regard to finding out the problems in learning and teaching of pronunciation in Pakistan, Akram and Qureshi (2012) have noted that Pakistani learners pronounce /p/, /k/, /t/ as unaspirated whereas they pronounce /r/ in words and do not make a distinction in /v/ and /w/. They argue that the learners make an error by replacing the /ɒ/, /ɔ:/ sounds with /ɑ:/, /ɔɪ/ with /ai/, and /3:/ is mostly changed to /ər/ or /ʌr/. /r/ is found after /ɪə/, /eə/ and /ʊə/ in /r/ ending-words.

Summing up, researchers' definition of PE (i.e., that of McArthur, 1992) as "a group of non-native varieties" asserts their acknowledgement that there are sub-varieties of PE that have always been represented at state level with the term 'Pakistani English' which was identified and acknowledged in late 1980s and beginning of the 1990s where scholar such as (Rahman, 1990; Baumgardner, 1991; McArthur, 1992) started exploring it. Nonetheless, there was a gap that, due to several different native languages, the sub-varieties exist within PE. Referring these sub-varieties under the national term PE did not seem to be fair at that stage but this view has been supported by recent scholars now. For example, Seargeant (2012) claims the presence of sub-varieties and urges the researchers to explore them as well. This is, thus, the rationale behind this research which has tried to represent six major sub-varieties of PE at phonemic level.

3. Research Methodology

The research design of this study is descriptive-qualitative in which the data has been collected using a list of specific words for consonants adopted from Afsar and Kamran (2011) and from Wells' (1982) vowel list. The primary data for the research comprised of recordings of the participants in formal setting. Native speakers of standard dialects of the six major Pakistani languages i.e. Urdu, Saraiki, Sindhi, Balochi, Pashto and Punjabi were selected using the convenience sampling technique. Three speakers from each language were chosen as the sample among the accessible population at Quaid-i-Azam University Islamabad. This institute has linguistic as well as cultural diversity as students from all over Pakistan study here. The recording was done using Cool Edit Pro 2.1 that shows live spectrogram of voice and intensity of the voice being recorded as well as the level of background noise. Then these recordings were edited with Cool Record Edit in order to remove redundancy and tongue slips etc.

The study was based on transcriptions of the recordings. After extensive listening practice of all the possible vowels from "www.IPA.org" and other online sources, the researchers were able to make a fine distinguish and transcribe the pronunciation of the speakers. The software used for editing (Cool Record Edit) provided enough information i.e. about sound-wave, length, and voicing that it helped a lot in differentiating among phonemes. In the analysis section, only those speech segments have been discussed that are different from SBE. The data for such segments have been presented in the appendix.

4. Data Analysis

Analyses of both vowels and consonants have been presented below in section 4.1 and 4.2 respectively. Only those segments have been discussed that exhibit some variation. Segments, that were similar, were excluded from the discussion.

4.1. Data Analysis of Vowels

The close-mid front unrounded STEP vowel /e/ is realized as /ɛ/ in these six sub-varieties as the transcriptions of the lexical set *step [step], edge [edʒ], ready [ˈredi]* shown in the table 1 (in appendix). /ɛ/ is an open-mid front unrounded vowel in RP whereas /e/ is close mid front unrounded. In Sin-E, /e/ also have some realizations as /e̞/. However, /e/ was also realized as /æ/ in Sar-E in some articulations.

The RP near open front unrounded TRAP vowel /æ/ is realized as /ɛ:/ in Ur-E, Sin-E, Bal-E, Pash-E, and Pun-E as the transcriptions of the lexical set *back [bæk], badge [bædʒ], cancel[ˈkænsl]* show in the table 2 (in appendix). However, it has almost the same realization in Sar-E.

The open back unrounded LOT vowel /ɒ/ is realized as /ɔ/ in these sub-varieties. This sound /ɔ/ has the maximum realizations in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E and Pun-E as the transcriptions of the lexical set *stop [stɒp], sock [sɒk], dodge [dɒdʒ]* show in table 3 (in appendix).

The open mid back unrounded STRUT vowel /ʌ/ is realized as mid central (schwa) /ə/ in Ur-E, Sin-E, Bal-E, Pash-E, and Pun-E as the transcriptions of the lexical set *suck [sʌk], pulse [pʌls], trunk [trʌŋk]* has shown in table 4. However, it has the same realization in

Sar-E. This RP vowel /ʌ/ is restructured to the nearest available vowel /ə/ in these sub-varieties because /ʌ/ does not exist in L1 of these sub-varieties except Sar-E.

The near-close, near-back rounded FOOT vowel /ʊ/ is realized as /ʊ/ in Ur-E, Sar-E, Sin-E, and in Pash-E as the transcriptions of the lexical set *bush [bʊʃ], good [gʊd], wolf [wʊlf]* show in the table (4.6). In Sin-E, this phoneme was realized as /ʊ/ most of time. Although the height of the vowel was affected in the word "wolf" in two occurrences. The other one as /ɑ/ is most probably individual or mispronunciation. In Bal-E, it is almost completely realized as close-mid back rounded /o/ (table 5).

The open back unrounded BATH vowel /ɑ:/ is also realized as /a:/ in Ur-E as the transcriptions of the lexical set *staff [stɑ:f], ask [a:sk] [da:ns], dance* show in table (6). In Sar-E, Sin-E, Bal-E, Pash-E, and Pun-E, it is realized as low central /a:/. The effect of American English can be seen in /ɖæns/ of speaker two where /ɑ:/ was changed to /æ/.

The open mid unrounded NURSE vowel /ɜ:/ is realized /ər/ in Ur-E, Sin-E, Pash-E, and Pun-E as the transcriptions of the lexical set *hurt [hɜ:t], urge [ɜ:dʒ], term [tɜ:m]* show in table 7 (in appendix). However, it is realized as /ʌr/ in Sar-E. Although /ɜ/ has two to four realizations in these sub-varieties, it is always rhoticised and realized as /ɝ:/ or /ɜ:r/.But it is non-rhotic in RP.

The RP FACE diphthong /eɪ/ is not found in any of the sub-variety of PE i.e. Ur-E, Sar-E, Sin-E, Bal-E, Pash-E, Pun-E. It is replaced with /e:/ close-mid unrounded vowel in English spoken in Pakistan as the transcriptions of the lexical set *tape [teɪp], cake [keɪk], day [deɪ]* show in table (8). It is because this diphthong is not present in the L1's of these sub-varieties and, thus, is changed to the nearest available phoneme.

The long open-mid back rounded THOUGHT vowel /ɔ:/ is realized mostly as /a/ and to some extent as /ɔ̞/ in these varieties of PE as the transcriptions of the lexical set *thought [θɔ:t], hawk [hɔ:k, jaw [dʒɔ:]* show in table 9. /a/ is open central unrounded whereas /ɔ̞/ is open mid back but less rounded here. This RP /ɔ/ was realized as /ɔ̞/ in Ur-E and to some extent in Pun-E. However, it was realized as /a/ in Sar-E, Sin-E, Bal-E and Pash-E.

The GOAT diphthong /əʊ/ is changed to /o:/ in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E, and Pun-E as the transcriptions of the lexical set *soap [səʊp], home [həʊm], so[səʊ]* show in the table 10. This diphthong is, therefore, not found in these sub-varieties of PE.

The CHOICE diphthong /ɔɪ/ has a different realization in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E, Pun-E as compared to RP where it starts from open-mid back round vowel /ɔ/ and ends at near-close, near-front unrounded vowel /ɪ/. The articulation of this phoneme in these sub-varieties is /aɪ/ as the transcriptions of the lexical set *noise [nɔɪz], join [dʒɔɪn], toy [tɔɪ]* show in the table 11.

The NEAR diphthong /ɪə/ is realized as /ɪə/ in Sin-E, Bal-E, Pash-E, and Pun-E. However, word-finally, when it is followed by a /r/ sound, it is always rhotisized as the transcriptions of the lexical set *bear [beə(r)], sincere [sɪnˈsɪə(r)], fear[fɪə(r)]* shows in the table (12). In Ur-E, /ɪə/ was realized as /eəɹ/ (table 4.17). This diphthong is realized as /ɪʌ/ in Sar-E. Sin-E and Pash-E has one realization as /eəɹ/.

The SQUARE diphthong /ɛə/ is realized as /eə/ in all of these sub-varieties of PE as the transcriptions of the lexical set *care [keə(r)], fear [fɪə(r)], wear [weə(r)]* shows in table 13.

The change is notable in the first segment of this diphthong which changes from open-mid /ɛ/ to close-mid /e/.

4.2. Data Analysis of Consonants
i.   Plosives

In the sub-varieties of PE, the voiceless plosive /p/ varies from the RP /p/ in two aspects as the transcriptions of the lexical set *pay [peɪ], suppose [səˈpəʊz], police [pəˈliːs], puppy [ˈpʌpi], map [mæp]* show in table (14). The first difference is that it is aspirated nowhere in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E, and Pun-E. Whereas in RP, it is realized as /p/ and /pʰ/ which is purely complementary distribution although it can be realized differently in terms of free distribution like ejective release /p!/. But it has only one realization in the sub-varieties of PE and is always found to be unaspirated unconditionally.

The second difference involves gemination. Majority of the occurrences of /p/ was geminated where it was double in the orthography of words such as "suppose, puppy". /p/ was not geminated in *suppose* by two speakers in Sar-E. An underlying pattern is also visible i.e. on the one hand schwa was inserted where /p/ was geminated while on the other hand schwa was not inserted where /p/ was not geminated (table 14).

Voiceless plosive /k/ is present in all of the sub-varieties of PE. But it is also not aspirated in these sub-varieties of PE as the transcriptions of the lexical set *cooking [ˈkʊkɪŋ], curious [ˈkjʊəriəs], hook [hʊk]* show in the table (15). However, /k/ is aspirated word-initially and in stressed syllable not following /s/ in RP.

Voiceless plosive /t/ is realized as retroflex /ʈ/ in all the sub-varieties of PE as the transcriptions of the lexical set *toy [tɔɪ], attack [əˈtæk], matter [ˈmætə(r)], outlast [ˌaʊtˈlaːst]* show in (table 16). However, there was only one /t/ realization in Sar-E (speaker 1) and one in Bal-E (speaker 2). This is because these varieties contain the phoneme /ʈ/ rather than /t/ which is found in RP. In RP /t/ is also systematically glottalized. Besides, this retroflex /ʈ/ which is nor aspirated neither glottalized at any position in a word.

In all of these sub-varieties of PE, the voiced plosive /d/ is realized as retroflex /ɖ/ as the transcriptions of the lexical set *day [deɪ], delay [dɪˈleɪ], order [ˈɔːd ə(r)], raid [reɪd]* show in table (17). This is also because these varieties contain the phoneme /ɖ/ rather than /d/. Therefore, these sub-varieties have a retroflex /ɖ/ which is never devoiced at any position in words.

ii.   Fricatives

The voiced fricative /ʒ/ of RP is realized differently in PE as the transcriptions of the lexical set *television [ˈtelɪvɪʒn], pleasure [ˈpleʒə(r)], conclusion [kənˈkluːʒn]* shows in table 18. In Ur-E, it had four realizations as /dʒ/, four as /ʒ/ and one as /j/. In Sar-E, it realized as /j/, however, it also had two occurrences as /ʒ/. In Sin-E, it is realized as /j/. In Bal-E, it is also realized as /ʒ/ and as /j/. In Pash-E, it was realized as /ʃ/ and as /ʒ/ most of the and twice as /j/. In Pun-E, it was realized as /j/ most of the times while it as realized as /ʒ/ by speaker 2. In Puj-E, /ʒ/ was realized as /j/ with two occurrences as /ʒ/.

The voiceless dental fricative /θ/ is not realized as a dental fricative in the sub-varities of PE. Instead, it is realized as dental stop /t̪ʰ/ in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E, and Pun-E as the transcriptions of the lexical set *think [θɪŋk], theology [θiˈɒlədʒi], method*

[ˈmeθəd], both [bəʊθ] show in table (19). However, in Bal-E, this dental stop is further non-aspirated i.e. Balochi speakers produce it as /t̪/ rather than /t̪ʰ/ (table 19). In Pash-E, both realizations (/t̪/, /t̪ʰ/) occur.

The voiced dental fricative /ð/ is also realized differently in PE. In Ur-E, Sar-E, and Sin-E, Bal-E, Pash-E, and Pun-E, it is realized as dental stop /d̪/ as the transcriptions of the lexical set *this [ðɪs], although [ɔːlˈðəʊ], brother [ˈbrʌðə(r)]* in the table 20 show. Therefore, this RP fricative has become a dental stop in these sub-varieties of PE. Where /ð/ was realized as /t̪ʰ/, it was due to the incidental differences.

The RP voiced labio-dental fricative /v/ is realized as labio-dental approximant /ʋ/ in the sub-varieties of PE - Ur-E, Sar-E, Sin-E, Bal-E, Pash-E, and Pun-E- as the transcriptions of the lexical set *vet [vet], covert [ˈkʌvət], love [lʌv]* has shown in Table 21.

iii. Liquids

The lateral liquid /l/ has only one realization which is alveolar /l/ in all the sub-varieties of PE as the transcriptions of the lexical set *low [ləʊ], legal [ˈliːgl], mellow [ˈmeləʊ], illegal [ɪˈliːgl], illiterate [ɪˈlɪtərət]* in Table (22) show. In RP, it has four realizations which are conditioned whereas in PE it has only one. Moreover, as the evidence from the data, this consonantal phoneme is also geminated in the sub-varieties.

iv. Glides

The RP bilabial approximant /w/ is realized as labio-dental approximant /ʋ/ in the sub-varieties of PE as the transcriptions of the lexical set *was [wɒz], warm [wɔːm], aware [əˈweə(r)]* has shown in table.

v. Nasals

The RP velar nasal /ŋ/ is also realized same in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E, and Pun-E (table 24). However, this phoneme differs in that it forms a consonantal cluster such as /ŋg/ and /ŋk/ when it is followed by the velar stop /g/ or /k/ as in "sing, singer" and "sink". As the data transcriptions (table 5.24) of the lexical set *singer [ˈsɪŋə(r)], sing [sɪŋ], sink [sɪŋk], king[kɪŋ]* show, the cluster /ŋg/ was realized in all the utterances while the cluster /ŋk/ was realized in all of the utterances of "sink" in Sar-E, Sin-E, Bal-E, Pash-E, and Pun-E. This cluster was not formed in only one utterance of Sar-E, and Pash-E. However, in Ur-E, these clusters were formed most of the time although not completely like it happened in other varieties.

5. Results and Discussions

The RP phonemes have found to be substituted with the nearest equivalent segment of L1 of every variety in cases where an RP segment was absent or different from the L1s of speaker. For example, the RP dental fricatives /θ/, /ð/ are not found in L1 of Urdu, Punjabi speaker. In this case they were replaced with dental stops /tʰ/ /d̪/ respectively. Because restructuring of segments has been found both in vowels and consonants, therefore, restructuring in vowels is discussed first.

5.1. Restructuring in vowels

The restructuring process in vowels can be described in terms of two types of vowels (i) monophthongs and (ii) diphthongs.

In Ur-E, vowel /e/ is changed to /ɛ/ and the near open front unrounded vowel /æ/ is substituted with /ɛ:/. The vowel /ɒ/ is restructured to /ɔ/ whereas the vowel /ʌ/ is restructured to /ə/. The vowel /ɑ:/ is centralized and is realized as /a:/. The vowel /ɜ:/ is realized /ər/. The diphthong /eɪ/ is flattened to /e:/ whereas /əʊ/ is flattened to /o:/. The diphthong /aʊ/ has the same realization except word finally. But /ɛə/ is restructured to /eə/.

In Sar-E, /e/ is also changed to /ɛ/ while /æ/ has the same realization. The vowel /ɒ/ is restructured to /ɔ/ whereas /ɑ:/ is centralized and is realized as /a:/. The vowel /ɜ:/ is realized /ʌr/.and /ɔ:/ is restructured to /a:/. The diphthong /eɪ/ is restructured to /e:/, /əʊ/ to /o:/, and /ɛə/ to /eə/.

In Sin-E, /e/ and /æ/ are also restructured to /ɛ/ (/ɛ:/). The vowel /ɒ/ is restructured to /ɔ/ and /ʌ/ to /ə/. The vowel /ɑ:/ is centralized as /a:/ and /ɜ:/ is realized as /ər/. The diphthong /eɪ/ is restructured to /e:/ whereas /əʊ/ is changed to /o:/. The diphthong /ɛə/ is restructured to /eə/. Besides, epenthesis of /ɪ/ before the sibilant /s/ followed by a stop was commonly noted in Sin-E and Bal-E. For instance, in *step* [ɪsʈep].

In Bal-E, /e/ and /æ/ are also restructured to /ɛ/ (/ɛ:/), /ɒ/ to /ɔ/, /ɔ/ to /a/, and /ʌ/ to /ə/. The vowel /ʊ/ is realized as /o:/, whereas /ɑ:/ is centralized as /a:/ and /ɜ:/ is realized as /ər/. The diphthong /eɪ/ is restructured to /e:/ whereas /əʊ/ is changed to /o:/. The diphthong /ɛə/ is restructured to /eə/.

In Pash-E, /e/ and /æ/ are also restructured to /ɛ/ (/ɛ:/). The round vowel /ɒ/ is restructured to /ɔ/ whereas /ɔ/ is lowered to /a/, /ʌ/ is centralized to /ə/, /ɑ:/ is centralized to /a:/, and /ɜ:/ is realized as /ər/. The diphthong /eɪ/ is flattened to /e:/ whereas /əʊ/ to /o:/.

In Pun-E, /e/ and /æ/ are also restructured to /ɛ/. The round vowel /ɒ/ is restructured to /ɔ/. The vowel /ɔ/ is restructured to /a/, whereas other vowels i.e. /ʌ/ to /ə/, /ɑ:/ to /a:/, and /ɜ:/ to /ər/. The diphthong /eɪ/ is flattened to /e:/ whereas /əʊ/ to /o:/.

5.2. Restructuring in Consonants

The restructuring process in consonants of these six sub-varieties of PE can be described in terms of variation processes i.e. dentalization, retroflexation and realization of /v/ and /w/ as /ʋ/.

The RP dental fricatives /θ/, /ð/ are realized dental stops /t̪ʰ/, /d̪/ in Ur-E, Sar-E, Sin-E, and Pun-E. However, in Bal-E and Pash-E /t̪ʰ/ is mostly unaspirated i.e. realized as /t̪/. In some of the occurrences the speakers seem to have overcome the effect of L1 interference.

The RP alveolar plosives /t/ and /d/ are realized as retroflex alveolar stops /ʈ/, /ɖ/ in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E and Pun-E. Devoicing of /d/ is commonly realized in RP but this retroflex /ɖ/ is not devoiced at any position in a word i.e. initial, medial, final. The voiced fricative /ʒ/, however, is realized differently in these sub-varieties. In Ur-E and Bal-E, it has /dʒ/ as well as /ʒ/realization. In Pun-E, Sin-E, and Sar-E, this RP /ʒ/ has been restructured to /j/. In Pash-E, it is restructured to /ʃ/. Elimination of the distinction between

/v/ and /w/ have been found in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E and Pun-E. These two RP phonemes have been restructured to /ʋ/ in these sub-varieties of PE.

Gemination have found to be a common but typical phenomenon within these sub-varieties. Because gemination of consonants is very common in Pakistani languages, therefore, this feature has also transferred to English spoken by Pakistanis. For example, it is common for Urdu, Saraiki, Sindhi, Balochi, Pashto, and Punjabi speakers to geminate segments in the words containing double graphemes as in the words *illiterate, illegal, puppy, dissatisfaction etc.* The double graphemes "*ll, pp, ss"* have double articulation in their speech. Another common typical feature of these sub-varieties of PE is the unaspiratedness of voiceless stops unconditionally and irrespective of position of occurrence in words. Neither of /p/, /k/, /t/ is aspirated in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E or Pun-E.

A typical feature of RP is the glottalization as in many BE varieties, /t/ may be realized as [ʔ] other than at the onset of stressed syllable. Whereas this glottalization is nowhere active and realized in any of the sub-varieties of PE. The analysis of the results in show that /t/ was not glottalized in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E or Pun-E.

The lateral approximant /l/ has only alveolar realization in these sub-varieties of PE whereas it has four realizations in RP. The realization of /t/ and /d/ as tapping and flapping seems absent from these sub-varieties of PE. However, rhoticity is also the common and typical characteristic of the sub-varieties of PE. Unlike RP, /r/ sounds are produced in the words. However, there are some words whose speech patterns are so fixed that some /r/ sounds in them are not articulated, for example *order, board*.

The RP velar nasal /ŋ/ is realized same in these sub-varieties of PE. Nonetheless, the stops are pronounced after velar nasal /ŋ/ - such as in *sink, king* - in the sub-varieties of PE. This feature is found in Ur-E, Sar-E, Sin-E, Bal-E, Pash-E and Pun-E.

5.3. Development of Phonemic Inventories

Based on the analysis of the primary data, phonemic inventories of Ur-E, Sar-E, Sin-E, Bal-E, Pash-E and Pun-E have been developed.

i. Urdu English

Chart (1) is the chart of consonantal phonemes of Ur-E. There are 23 consonants in this sub-variety of PE.

	Bilabial		Labio-dental		Dental		Alveolar		Palato-Alveolar		Retroflex		Palatal		Velar		Glottal	
Voice	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Plosive		p						t̪ʰ				ʈ				k		
	b				d̪						ɖ				g			
Fricatives				f			z	s	(ʒ)	ʃ								h
Tap/flap							R											
Affricates													dʒ	tʃ				
Liquids							L											
Glides	ʋ												j					
Nasals	m						N								ŋ(g)			

Chart 1. Consonants of Ur-E

Ur-E has 10 basic vowel system. The chart (2) shows the vowels Ur-E.

	Front		**Central**	**Back**	
High	i	ɪ			u
High-mid	E			ʊ	
Mid	ɛ		ə		o
Low-Mid					ɔ̧
Low			a		

Chart 2. Vowels of Ur-E

The RP monophthongs /æ/, /ɒ/, /ʌ/, /ɜː/, and the diphthongs /ɔɪ/, /əʊ/, /ei/ are not found in Ur-E. The voiceless plosives /p/, /t/, /k/ are always unaspirated. The voiced plosives /ɖ / and the voiceless plosive /ʈ / are retroflex consonants. /t̪ʰ/ and /d̪/ are dental stops. Instead of /v/ and /w/, only the approximant /ʋ/ is present. The voiced palato-alveolar /ʒ/ is also realized /dʒ/ by some speakers. /ŋ(g)/ is realized only in the words that end on a velar nasal /ŋ/ followed by a stop such as *king, ring*. However, the consonants /b/, /g/, /l/, /r/, /j/, /f/, /s/, /tʃ/, /ʃ/, /h/, /dʒ/, /z/, /m/, /n/ did not restructure or change in Ur-E.

ii. Saraiki English

The chart (3) has been developed as the consonantal chart of Sar-E. This sub-variety distinguish 22 consonants.

	Bilabial		Labio-dental		Dental		Alveolar		Palato-Alveolar		Retroflex		Palatal		Velar		Glottal	
Voice	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Plosive		p				t̪ʰ						ʈ				k		
	b				d̪						ɖ				g			
Fricatives				f			z	s		ʃ								h
Tap/flap							R											
Affricates													dʒ					
													tʃ					
Liquids							L											
Glides	ʋ												j					
Nasals	m						N								ŋ(g)			

Chart 3 Consonants of Sar-E

Sar-E has 10 basic vowels in its phonemic inventory which have been presented in chart (4).

	Front		Central	Back	
High	i	ɪ			u
High-mid	E			ʊ	
Mid				ʌ	o
Low-Mid	Æ				ɔ̧
Low			a		

Chart 4. Vowels of Sar-E

The RP monophthongs /ɒ/, /ɜː/, and diphthongs /ɔɪ/, /əʊ/, /ei/ are not found in Sar-E. The voiceless plosives /p/, /t/, /k/ are always unaspirated. The voiced plosives /ɖ/ and the voiceless plosive /ʈ/ are retroflex consonants. Sar-E makes use of /t̪ʰ/ /d̪/ instead of RP dental fricatives. The phoneme /v/ and /w/ does not exist. Instead only the approximant /ʋ/ employed in their place. /ʒ/ is realized as /j/ while /ŋ(g)/ occurs instead of /ŋ/ in the words ending in velar stop.

iii. Sindhi-English

Like Sar-E, Sin-E also distinguish 22 consonants. The chart (5) shows the consonants of Sin-E.

	Bilabial		Labio-dental		Dental		Alveolar		Palato-Alveolar		Retroflex		Palatal		Velar		Glottal	
Voice	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Plosive		p				t̯ʰ						ʈ				k		
	b				d̯						ɖ				g			
Fricatives			f				z	s	ʃ									h
Tap/flap							R											
Affricates													dʒ	tʃ				
Liquids							L											
Glides	ʊ												j					
Nasals	m						N								ŋ(g)			

Chart 5. Consonants of Sin-E

Sin-E also have ten vowel system. The chart (6) shows the vowels of Sin-E.

	Front		Central	Back	
High	i	ɪ			u
High-mid	E			ʊ	
Mid	ɛ		ə		o
Low-Mid					ɔ
Low			a		

Chart 6. Consonants of Sin-E

The RP monophthongs /æ/, /ɒ/, /ʌ/, /ɜ:/, diphthongs /ɔɪ/, /əʊ/, /ei/ are not found in Sin-E. /p/, /t/, /k/ are always unaspirated whereas voiced plosives /ɖ / and the voiceless plosive /ʈ / are retroflex consonants. The dental stops /t̯ʰ/ and /d̯/ are employed instead of RP dental fricatives. The phoneme /v/ and /w/ does not exist. Instead only the approximant /ʊ/ employed in their place. /ʒ/ is realized as /ʃ/ while /ŋ(g)/ occurs instead of /ŋ/ in the words ending in velar stop.

iv. Balochi English

Bal-E also has 22 consonants in its phonemic inventory. The chart (7) shows the consonants of Bal-E.

	Bilabial		Labio-dental		Dental		Alveolar		Palato-Alveolar		Retroflex		Palatal		Velar		Glottal	
Voice	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Plosive		p				t̪						ţ				k		
	b				d̪						ḍ				g			
Fricatives				f			z	s	(ʒ) ʃ									h
Tap/flap							R											
Affricates													dʒ tʃ					
Liquids							L											
Glides	ʋ												j					
Nasals	m						N								ŋ(g)			

Chart 1. Consonants of Bal-E

There are ten basic vowels in the phonemic inventory of Bal-E. The chart (8) shows the vowels of Bal-E.

	Front	Central	Back
High	i ɪ		u
High-mid	E		ʊ
Mid	ɛ	ə	o
Low-Mid			ʔ
Low		a	

Chart 2. Vowels of Bal-E

The RP monophthongs /æ/, /ɒ/, /ʌ/, /ɜ:/, diphthongs /ɔɪ/, /əʊ/, /ei/ are not found in Bal-E. The voiceless plosives /p/, /t/, /k/ are always unaspirated. The voiced plosives /ḍ / and the voiceless plosive /ţ / are retroflex consonants in Bal-E. /t̪/ and /d̪/ are dental stops and unlike other sub-varieties /t̪/ is unaspirated. Besides, this variety has approximant /ʋ/ like other sub-varieties and /ʒ/ is realized as /j/. The voiced palato-alveolar /ʒ/ can have the same realization or can be produced /ʃ/. The velar nasal /ŋ/ is realized as /ŋg/, /nk/ in words ending in velar stop.

v. Pashto English

Pash-E also has 22 consonants in its phonemic inventory. The chart (9) shows the consonants of Pash-E.

	Bilabial		Labio-dental		Dental		Alveolar		Palato-Alveolar		Retroflex		Palatal		Velar		Glotal	
Voice	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Plosive	p				t̪ (t̪ʰ)						ʈ				k			
	b				d̪						ɖ				g			
Fricatives			f				z	s	ʃ								h	
Tap/flap							R											
Affricates													dʒ	tʃ				
Liquids							L											
Glides	ʋ												j					
Nasals	m						N								ŋ(g)			

Chart 3. Consonants of Pash-E

Pash-E has ten basic vowels in its phonemic inventory as the chart (10) shows.

	Front	Central	Back
High	i ɪ		u
High-mid	E		ʊ
Mid	ɛ	ə	o
Low-Mid			ɔ̰
Low		a	

Chart 4. Vowels of Pash-E

vi. Punjabi English

Pun-E has 22 consonants in its phonemic inventory as the following chart (11) shows.

	Bilabial		Labio-dental		Dental		Alveolar		Palato-Alveolar		Retroflex		Palatal		Velar		Glottal	
Voice	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Plosive		p				t̪ʰ						ʈ				k		
	b				d̪						ɖ				g			
Fricatives			f				z	s	ʃ									h
Tap/flap							R											
Affricates													dʒ	tʃ				
Liquids							L											
Glides	ʋ													j				
Nasals	m						N								ŋ(g)			

Chart 5. Consonants of Pun-E

Pun-E also has ten basic vowels in its phonemic system. These vowels have been shown in the chart (12).

	Front		Central	Back	
High	i	ɪ			u
High-mid	E				ʊ
Mid	ɛ		ə		o
Low-Mid					ɔ̣
Low			a		

Chart 6. Vowels of Pun-E

5.4. Summary

Ur-E and Pun-E have a set of 23 consonants while Sar-E, Sin-E, Bal-E, and Pash-E have 22 consonants. While in terms of vowel system, all of them have 10 vowels. The RP monophthongs /æ/, /ɒ/, /ʌ/, /ɜː/, and the diphthongs /ɔɪ/, /əʊ/, /eɪ/ are not found in these sub-varieties. Voiceless plosives are unaspirated in all of them. Dental fricatives do not exist. The RP vowels /e/, /ɒ/, /ɔ/, /ʌ/, /ɜː/, /æ/, /eɪ/, /əʊ/ are restructured while the consonants /t/, /d/, /ʒ/, /v/ and /w/ are restructured.

Nevertheless, only one sub-variety, Sar-E, exhibited the presence of mid back unrounded /ʌ/ and the near front unrounded vowel /æ/. These two vowels were found to be absent in other five sub-varieties. Also, Pash-E differs from other sub-varieties in that the voiced post-alveolar /ʒ/ is restructured to voiceless postalveolar fricative /ʃ/. Further the dental stop, /t̪/, which is a phonemic restructuring of RP /θ/, is unaspirated but speakers equally overcome the interference of L1 and articulate it as aspirated /t̪ʰ/.

In terms of consonants Pun-E, Sar-E, and Sin-E share more features. For instance, maximum match in segments of phonemic inventories was observed.

i)   Except Sar-E, /ʌ/ is restructured to /ə/ in other five sub-varieties.

ii)   All of these six sub-varieties are similar in terms of aspiration of voiceless plosives as none of them aspirate /p/, /k/, /t/.

iii)   Retroflexation is prevalent in all of these varieties as the voiced alveolar stops /d/ and voiceless stop /t/ are restructured to /ṭ/ and /ḍ/.

iv)   The dental fricatives are restructured to dental stops in all of these six sub-varieties. However, unlike other sub-varieties, Bal-E has an unaspirated dental stop /t̪/ whereas Pash-E can have either aspirated /t̪ʰ/ or unaspirated /t̪/ dental stop.

v)   None of these varieties have /v/ and /w/ in their phonemic system. Instead, they all make use of /ʋ/

vi)   They are also similar in terms of retroflexation. All these sub-varieties of PE make use of retroflex / ʈ /, /ɖ / instead of alveolar stops. In addition, the lateral liquid /l/ has only one realization of clear /l/.

vii)   Gemination is very commonly found in all of these sub-varieties.

viii)   A velar stop is usually present after the velar nasal /ŋ/

ix)   Restructuring of /ʒ/ is also very common in these varieties except in Ur-E.

6.   Conclusion

This study undertook the phonemes of PE where it, through the phonological analysis, analyzed the phonemes by proposing that an English speaker's L1 restructures the phonological system of their L2/L3 because there are several different languages in Pakistan which trigger the sub-varieties within PE. After analysis, it was found that these sub-varieties correspond and differ in terms of the way the phonemes are realized.

The answer to the first question of the study pertains to restructuring which was found in both consonants and vowels. The restructuring of phonemes was largely due to the force from first languages of the speakers. Where it was possible the nearest segments from the L1s were employed by the speakers, otherwise the segments were either substituted or restructured. Also, speakers were found less likely to try to overcome the transfer from their L1s.

the following are the concluding points:

a. Restructuring of vowels involve: lowering, heightening, centralizing and monophthongisation. These are shared by all of the six sub-varieties.

b. Contrary to English and similar to South Asian English, the sub-varieties of PE do not employ aspiration in voiceless plosives.

c. Retroflexation of /t/ and /d/ is found in all of these six sub-varieties.

d. Dentalisation of dental fricatives is also found in all of the six sub-varieties.

e. Gemination is very common in Ur-E, Sar-E, Bal-E, Sin-E, Pash-E, and Pun-E.

f. All of the sub-varieties are rhotic.

g. There is no distinction in /v/ and /w/. These two phonemes are replaced with /ʋ/.

These sub-varieties of PE have either 22 or 23 consonant system whereas they have 10 vowels in terms of their vowel system. All of them are maximally similar in terms of their consonantal and vowel features.

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Appendix I

World list used for analysis of vowels and consonants

vowel	Keywords	Words	Conso.	
ɪ	KIT	sick, bridge, busy	p	pay, suppose, police, puppy, map
e	DRESS	step, edge, ready	k	cooking, curious, hook
æ	TRAP	back, badge, cancel	t	toy, attack, matter, outlast
ɒ	LOT	stop, sock, dodge	b	bacon, jubilee, bulb
ʌ	STRUT	suck, pulse, trunk	d	day, delay, order, raid
ʊ	FOOT	bush, good, wolf	g	guard, ring, hugging,
ɑː	BATH	staff, ask, dance	θ	think , theology, method, both
ɜː	NURSE	hurt, urge, term	ð	this, although, brother
iː	FLEECE	eat, speak, key	l	low, legal, mellow, illegal, illiterate
ei	FACE	tape, cake, day	r	roar, marine, refer, minor
ɔː	THOUGHT	taught, hawk, jaw	j	youth, cure, hue
əʊ	GOAT	soap, home, so,	w	was, worm, aware
uː	GOOSE	shoot, mute, view	v	vet, covert, love
aɪ	PRICE	write, arrive, try	f	fur, laughed, cough
ɔɪ	CHOICE	noise, join, toy	s	see, houses, promise
aʊ	MOUTH	out, loud, cow	tʃ	speech, chew, church
ɪə	NEAR	beer, sincere, fear	ʃ	ship, construction, institutionalization
ɛə	SQUARE	care, fair, where	h	hope, inhuman,
ʊə	CURE	poor, tourist, plural	ʒ	television, pleasure, confusion
ə	schwa	comma), dilemma,	dʒ	joy, adjust, judge
			z	zeal, redesign, magazine, exhibition
			m	maximum, farm, autumn
			n	new, nationalization, resignation
			ŋ	singer, sing, sink, king

Appendix II

Full Transcriptions of the Recordings for the Analysis of Vowels

Table 1: *step, edge, ready*

Speakers	Transcriptions		
Speaker 1	[sʈɛp]	[ɛdʒ]	[ɹɛɖi]
Speaker 2	[sʈɛp]	[ɛdʒ]	[ɹɛɖi]
Speaker 3	[sʈɛp]	[ɛdʒ]	[ɹɛɖi]

Table 2: *back, badge, cancel*

Speakers	Transcriptions		
Speaker 1	[bɛ:k]	[bɛ:dʒ]	[kɛnsəl]
Speaker 2	[bæk]	[bɛ:dʒ]	[kɛnsəl]
Speaker 3	[bɛ:k]	[bɛ:dʒ]	[kɛnsəl]

Table 3: *stop, sock, dodge*

Speakers	Transcriptions		
Speaker 1	[sʈɔp]	[sɔk]	[dɔdʒ]
Speaker 2	[sʈɔp]	[sɔk]	[dɔdʒ]
Speaker 3	[sʈɔp]	[sɔk]	[dɔdʒ]

Table 4: *suck, pulse, trunk*

Speakers	Transcriptions		
Speaker 1	[sək]	[pəls]	[ʈɹənk]
Speaker 2	[sək]	[pəls]	[ʈɹənk]
Speaker 3	[səkʰ]	[pəls]	[ʈɹənk]

Table 5: *bush, good, wolf*

Speakers	Transcriptions		
Speaker 1	[bʊʃ]	[gʊd]	[ʋɑlf]
Speaker 2	[bʊʃ]	[gʊɖ]	[ʋʊlf]
Speaker 3	[bʊʃ]	[gʊɖ]	[ʋʊlf]

Table 6: *staff, ask, dance*

Speakers	Transcriptions		
Speaker 1	[sʈa:f]	[a:sk]	[ɖa:ns]
Speaker 2	[sʈa:f]	[a:sk]	[ɖa:ns]
Speaker 3	[sʈa:f]	[a:sk]	[ɖa:ns]

Table 7: *hurt, urge, term*

Speakers	Transcriptions		
Speaker 1	[hɝ:t]	[əɹdʒ]	[ʈɜ:m]
Speaker 2	[həɹʈ]	[əɹdʒ]	[ʈɚ:m]
Speaker 3	[həɹʈ]	[əɹdʒ]	[ʈəɹm]

Table 8: *tape, cake, day*

Speakers	Transcriptions		
Speaker 1	[ʈeːp]	[keːk]	[ɖeː]
Speaker 2	[ʈeːp]	[keːk]	[ɖeː]
Speaker 3	[ʈeːp]	[keːk]	[ɖeː]

Table 9: *taught, hawk, jaw*

Speakers	Transcriptions		
Speaker 1	[ʈʰɑːʈ]	[haːk]	[dʒaː]
Speaker 2	[ʈaːʈ]	[haːk]	[dʒaː]
Speaker 3	[ʈaːʈ]	[haːk]	[dʒaː]

Table 10: *soap, home, so*

Speakers	Transcriptions		
Speaker 1	[soːp]	[hoːm]	[soː]
Speaker 2	[soːp]	[hoːm]	[soː]
Speaker 3	[soːp]	[hoːm]	[soː]

Table 11: *noise, join, toy*

Speakers	Transcriptions		
Speaker 1	[naɪs]	[dʒʷãĩn]	[ʈaɪ]
Speaker 2	[naɪs]	[dʒãĩn]	[ʈaɪ]
Speaker 3	[naɪs]	[dʒwãĩn]	[ʈʷaɪ]

Table 12: *beer, sincere, fear*

Speakers	Transcriptions		
Speaker 1	[bɪəɹ]	[sɪnsɪəɹ]	[fɪəɹ]
Speaker 2	[bɪəɹ]	[sɪnsɪəɹ]	[fɪəɹ]
Speaker 3	[bɪəɹ]	[sɪnsɪəɹ]	[fɪəɹ]

Table 13: *care, fair, where*

Speakers	Transcriptions		
Speaker 1	[keəɹ]	[feəɹ]	[weəɹ]
Speaker 2	[keəɹ]	[feəɹ]	[weəɹ]
Speaker 3	[keəɹ]	[feəɹ]	[weəɹ]

Table 14: *pay, suppose puppy*

Speakers	Transcriptions		
Speaker 1	[peː]	[səppoːz]	[pəppɪ]
Speaker 2	[peː]	[səppoːz]	[pəppɪ]
Speaker 3	[peː]	[səppoːs]	[pəppɪ]

Table 15: *cooking, curious, hook*

Speakers	Transcriptions		
Speaker 1	[kʊkɪŋ]	[kuɹɪəs]	[hokʰ]
Speaker 2	[kʊkɪŋ]	[kjʊɹɪəs]	[hʊk]
Speaker 3	[kʊkɪŋ]	[kjʊɹɪəs]	[hʊk]

Table 16: *toy, attack, outlast*

Speakers	Transcriptions		
Speaker 1	[ʈaɪ]	[əʈæk]	[mɛʈəɹ]
Speaker 2	[ʈɔɪ]	[əʈæk]	[mæʈəɹ]
Speaker 3	[ʈɔaɪ]	[əʈæk]	[mɛʈəɹ]

Table 17: *delay, order, raid*

Speakers	Transcriptions		
Speaker 1	[ɖeː]	[ɖileː]	[ɹeːɖ]
Speaker 2	[ɖeː]	[ɖileː]	[ɹeːɖ]
Speaker 3	[ɖeː]	[ɖileː]	[ɹeːɖ]

Table 18: *television, pleasure, confusion*

Speakers	Transcriptions		
Speaker 1	[ʈɛlɪvɪjən]	[plɛjəɹ]	[kəŋfjuːjən]
Speaker 2	[ʈɛlɪvɪʒən]	[plɛjəɹ]	[kəŋfjuːʒən]
Speaker 3	[ʈɛlɪvɪjən]	[plɛjəɹ]	[kəŋfjuːjən]

Table 19: *think, method, both*

Speakers	Transcriptions		
Speaker 1	[ʈʰɪŋk]	[ʈʰɪələdʒi]	[mɛʈʰəd]
Speaker 2	[ʈʰɪŋk]	[ʈʰɪələdʒi]	[mɛʈʰəd]
Speaker 3	[ʈʰɪŋk]	[ʈʰɪələdʒi]	[mɛːʈʰəd]

Table 20: *this, although, brother*

Speakers	Transcriptions		
Speaker 1	[ɖɪs]	[aːlʈʰoː]	[bɹəɖəɹ]
Speaker 2	[ɖɪs]	[aːlɖoː]	[bɹəɖəɹ]
Speaker 3	[ɖɪs]	[aːlɖoː]	[bɹəɖəɹ]

Table 21: *vet, covert, love*

Speakers	Transcriptions		
Speaker 1	[ʋɛʈ]	[kɔʋəɹʈ]	[ləʊ]
Speaker 2	[ʋɛʈ]	[kɔʋəɹʈ]	[ləʊ]
Speaker 3	[ʋɛʈ]	[kʌoʋəɹʈ]	[lʌʊ]

Table 22: *legal, mellow, illegal*

Speakers	Transcriptions		
Speaker 1	[loː]	[mɛlloː]	[ɪllɪgəl]

| Speaker 2 | [loː] | [miːlloː] | [ɪllɪɡəl] |
| Speaker 3 | [loː] | [mɛlloː] | [ɪllɪɡəl] |

Table 23: *was, warm, aware*

Speakers	Transcriptions		
Speaker 1	[ʋaːz]	[ʋaːm]	[əʋeəɹ]
Speaker 2	[ʋaːz]	[ʋɜˑm]	[əʋeəɹ]
Speaker 3	[ʋaːz]	[ʋaːrm]	[əʋeəɹ]

Table 24: *singer, sing, sink*

Speakers	Transcriptions		
Speaker 1	[sɪŋɡəɹ]	[sɪŋɡ]	[sɪŋk]
Speaker 2	[sɪŋɡəɹ]	[sɪŋɡ]	]sɪŋk]
Speaker 3	[sɪŋɡəɹ]	[sɪŋɡ]	[sɪŋk]

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