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An Articulatory Analysis of English Consonants Produced by Pashto Native Speakers of Different Dialects

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ABSTRACT

This perceptual study explores the challenges faced by Pashto ESL learners in articulating nine English consonants. The study focuses on identifying the most problematic sounds and providing a learnable solution. Previous studies examined around six troublesome consonantal sounds, however, this perceptual and productive study focuses on the targeted consonantal sounds. The primary goal of the study is to determine why Khilji, Khatak, and Afridi dialects of Pashto speakers struggle with these sounds. The study examines the phonetic and phonological differences between the two languages and how these disparities affect the articulation of Pashto native speakers. The study is designed based on the Contrastive Analysis Theory formulated by Lado (1957). For this, nine consonants were selected for recording, which include the voiceless labio-dental fricative /f/, the voiced labio-dental fricative /v/, the voiceless dental fricative /θ/, the voiced dental fricative /ð/, the voiced post-alveolar fricative /ʒ/, the voiceless velar stop /k/, the voiceless alveolar ridge stop /t/, the voiced labio-velar approximant /w/ and the voiced alveolar stop /d/. By utilizing the purposive sampling technique, six participants were selected from colleges and universities in Karachi speaking three different dialects of Pashto. Pashto speakers recorded the speech stimuli as per protocols of the study. The results reveal that Pashto ESL learners find the voiceless labio-dental fricative /f/, voiceless velar stop /k/, voiceless alveolar ridge stop /t/, and voiced alveolar stop /d/ less challenging to articulate. On the other hand, the most problematic sounds were voiced and voiceless inter-dental fricatives /θ/ and /ð/, voiced labio-dental fricative /v/, voiced Alveo-palatal fricative /ʒ/ and voiced labio-velar approximant /w/. The finding reveals that the difference in sound systems between the two languages and the absence of sounds in their native language cause Pashto native speakers to have difficulty in pronouncing these sounds. The finding is not in line with the previous studies in terms of articulation variations on account of dialectal features.

Keywords: *English consonants, articulation, Pashto ESL learners, dialects, and problematic sounds.*

INTRODUCTION

According to Ethnologue's estimation in 2017, there are approximately 38 million Pashto speakers in the world. A majority of these speakers reside in Pakistan, where Pashto is a minority language spoken by about 13% of the population. However, it has no significant use in government and media. In Afghanistan, on the other hand, Pashto is an official language and

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is considered the national language and the mother tongue of the largest ethnic group in the country, making up about 52% of the population. Pashto has been a written language for almost four centuries and has a rich literary tradition (Eberhard et, al. 2023).

English is a global language that is widely used for communication with people all over the world through social media. Educational institutions use the English language for courses, lectures, and examinations. People all around the world aspire to converse fluently in English to gain a better self-identity and a good career. Nonetheless, English is Pakistan's official language, and Pashto speakers who want to communicate worldwide have long recognized its importance. In institutions and the workplace, Pashto native speakers speak English fluently, however, Pashto native speakers face problems producing several English consonant sounds. English learners who have a Pashto background face difficulties differentiating between vowel and consonant contrasts. There have been two studies on problematic consonantal sounds; one revealed the results for five consonant sounds, and the other revealed the results for six consonant sounds. However, this study examines nine problem-posing consonantal sounds. The study's main objective is to assess the articulation of a set of English consonants that are either absent or substituted by the closest sound in the Pashto sound system. The research examines the articulation of three different dialects: Eastern Khyber-Pakhtunkhwa (Abbottabad/Kohat) and Northern Baluchistan (Quetta). The nine selected English consonants were placed in three-syllable words at the initial, medial, and final positions. The investigation aimed to prove Lado's Contrastive Analysis Theory, which suggests that if the first language and the target language are nearly identical, learners will acquire the structure easily, and where they are dissimilar, learners will face challenges.

According to some experts, similarities and differences between two languages influence the learners' acquiring process of the target language. Moreover, there has been relatively little study in Pashto grammar in general and phonetics and phonology in particular, which means that there is a need for certain materials that are valuable in some way for Pashto speakers. That is why this research fills the gap between two earlier studies on the same issue. Figure 1. illustrates the map of Iranian languages as follows:

Figure 1. Iranian language family [https://iranian-languages.arizona.edu/Languages]

BACKGROUND

Pashto language

Pashto is a language spoken worldwide, primarily in the Khyber-Pakhtunkhwa region of Pakistan. The dialects of Pashto can be broadly categorized into two categories - Northern Pashto and Southern Pashto. Pashto has been referred to by different names in various books and literature. In Bellow's grammar book published in 1667, the term 'Pashto' was spelled as 'Pakkhto', which could have been done to demonstrate that it is a non-English word or due to Bellow's preference. Lorimer's grammar book, published fifty years after Bellow in 1915, used the name 'Pashtu' (Tegey & Robson, 1996).

Teaching English pronunciation

Effective instruction of English pronunciation is a crucial part of language teaching, especially for ESL/EFL students. To achieve this, language instructors should have a deep understanding of the sound systems of both the student's native language (L1) and the target language. However, some language teachers lack appropriate knowledge of phonetics and phonology, causing them to overlook this important aspect of instruction. In Khyber-Pakhtunkhwa, English pronunciation teaching is neglected at all educational levels, from middle school to university. As a result, Pashto ESL learners tend to make phonetic and phonological mistakes, leading to Pashto-influenced English rather than English-accented English. To address this issue, a study was conducted using Lado's Contrastive Analysis framework to identify the English phonemes that are most challenging for Pashto ESL learners and to determine how ESL students can improve their speaking skills.

Objectives of the study

To examine the English speech of Pashto speakers who speak three Pashto Khilji, Khatak, & Afridi dialects.
To identify English consonants either these exist in Pashto or substituted by the closest sounds in Pashto.
To judge the articulation and production of the nine-problem-posing consonants.

LITERATURE REVIEW

Sound systems of English and Pashto

English and Pashto have distinct sound systems. Although extensive research has been done on the phonetics and phonology of English, Pashto grammar and sound system have not received much attention. It is crucial to reexamine Pashto's grammatical structure, and understanding its sound system is essential to achieve the goal. It is important to note that English spellings can be misleading since English is a non-phonetic language. This fact has been pointed out by Ladefoged (2004) regarding English pronunciation. Below is a brief summary of the sound inventories of both languages.

Sound inventory of English

The English language is made up of 44 unique sounds, which can be divided into 24 consonants and 20 vowels. Of the remaining 12 sounds, eight are classified as diphthongs, and the rest are all vocalic in nature. Unlike phonetic languages, the pronunciation of English words is not solely determined by their spelling. According to Roach's (2004) analysis, there are 24 consonants in the English language: /p, b, t, d, k, g, m, n, ŋ, ʧ, ʤ, f, v, θ, ð, s, z, ʃ, ʒ, h, r, j, v, w, l/ and 20 vocalic sounds as follows:/eɪ, aɪ, ɔɪ, əʊ, aʊ, ɪə, eə, ʊə, i, ɪ, ɜ: ə, u, ʊ, e, ʌ, ɔ:, æ, ɑ, ɒ/.

Sound description of Pashto

There are 45 letters in Pashto with diacritic marks. Figure 2. illustrates the alphabet of Pashto language.

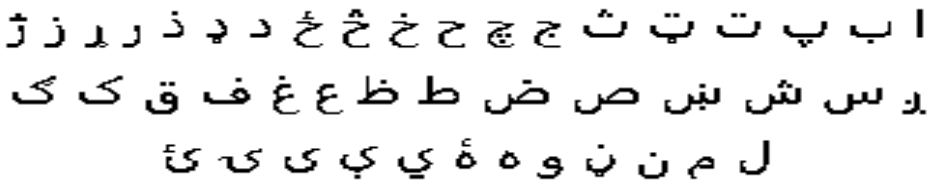

Figure 2. Pashto alphabet

Pashto has four short vowels, five long vowels, and 36 consonants. (/a/, /i/, /u/, /ə/) are the short vowels while (/a:/, /i:/, /u:/, /o:/, and /ə:/) are the long vowels. The following forty-five letters of Pashto are as follows: (/b/, /p/, /t/, /d/, /s/, /h/, /x/, /ts/, /z/, /r/, /z/, /s/, /z/, /s/, /t/, /z/, /f/, /q/, /k/, /g/, /l/, /m/, /n/, /w/, /ʔ/, /ʈ/, /ʃ/, /ʐ/, /ʤ/, /ʣ/, /ʒ/, /ʂ/, /ɻ/, /ɳ/, /ɣ/, /ɖ/, /ʧ/, /i/, /a/, /ə/, /e/, /ai/, /əi/, /j/, /o/. The Pashto language's phonological system exhibits similarities with other Indo-Iranian languages while also incorporating features from surrounding Indo-Aryan languages, including retroflex consonants (Eberhard et, al. 2023).

Mother tongue interference/ transfer

Troika's (2005) research on language acquisition suggests that the successful transfer of language skills from one language to another occurs when the same structure is used accurately in both languages. Negative transfer, also known as interference, happens when bilingual speakers mistakenly apply the structure of their first language to their second language. Weinreinch (1953) notes that phonic interference occurs when bilingual speakers hear and reproduce sounds of a different language, confusing them with their primary language.

Lado's Contrastive Analysis Theory (1957) suggests that the language and culture under study should be meticulously compared with the student's native language and culture to detect and characterize patterns that may cause difficulties in learning. This comparison should inform the development of educational and experimental materials. Positive transfer occurs when there are parallels between L1 and L2. Jones (1976) even recommends using second language learners' mother tongue vowels to teach English vocalic sounds. When acquiring a new language, transference and interference are inextricably linked, as Lado (1957) highlights. When attempting to integrate into a new cultural environment, individuals often transfer the linguistic structures and vocabulary from their native tongue, including the distribution of forms and meanings, into the foreign language.

To attain a comprehensive understanding of the language and culture as it is used by native speakers, one must approach the situation with an open and receptive mindset. It is commonly understood that when acquiring a foreign language, certain aspects may come more naturally, while others may present significant challenges. For instance, components that are similar to one's native language may be easier to comprehend, while those that are vastly different may prove more difficult to master.

Orthography of English language

The English alphabet consists of 26 letters, which can produce 44 different sounds. This unique feature of the language has been studied extensively by Kenstowicz (2005) who identified that each sound has a varying number of allophones. However, non-native speakers of English often struggle to associate these 44 sounds with the 26 letters due to the intricacies of English

spelling. Ladefoged (2001) noted the complexities of English spelling, which do not conform to the phonetic system. Davenport and Hannah (1998) further highlighted that the orthography of English can represent a single sound in many different ways. Bilingual speakers familiar with Pashto's dental and retroflex consonants may find it particularly challenging to differentiate between English and Pashto sounds.

Articulation and the vocal tract

According to Jones (1976), the shape and size of the vocal tract varies depending on the age and gender of the speaker. Even for the same speaker, different vowels are produced with different shapes of the vocal tract. The tongue and lips are the primary articulators responsible for shaping the air passage in the oral cavity. The voice box plays a crucial role in creating human speech. For consonant production, the primary articulators are velum, palate, alveolar, dental, bilabial, labiodental, lips, and tongue, as stated by Parson (1987). The voice track tube is about 17cm long in mature males, while the nasal cavity, from the uvula to nostril, is approximately 13cm long. Figure 3. illustrates the vocal track as follows:

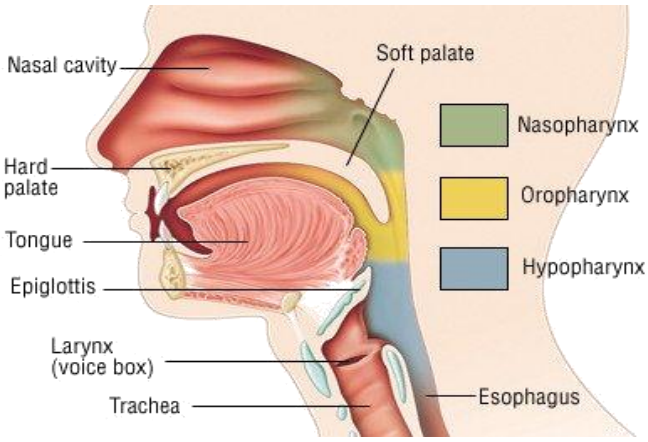

Figure 3: The larynx, pharynx, and vocal track

To speak English accurately, one must understand its phonetics and phonology. English pronunciation should be learned based on phonemes rather than letters, as the spelling of English can be confusing. According to a study by Rehman, Khan and Bukhari (2012), Pashto speakers struggle with certain English consonant sounds such as /v/, /ð/, /θ/, and /ʒ/ due to phonological differences between the two languages. Their research found that many participants mispronounced English consonants as Pashto consonants. This is because Pashto does not have a labio-dental voiceless fricative /f/ and instead uses a bilabial voiceless stop /p/. Swan and Smith (2001) created a reference guide for teachers to address phonological difficulties in students from various linguistic backgrounds. By comparing English to key elements of students' native languages, teachers can identify and understand the issues their students are facing.

Previous studies on other national languages i.e., Indo-Aryan language speakers and their L1 impact on L2 English speech production have been extensively investigated by (Abbasi, 2010). Abbasi (2010) notes that the Sindhi language has two versions of the phoneme /p/ aspirated and un-aspirated. As a result, Sindhi speakers pronounce /p/ without aspiration in all positions of a word, including word initially, in the middle, at the beginning and at the end. The /k/ sound in Sindhi also has two characters for the same phoneme in English with different meanings: aspirated and un-aspirated. While both are distinctive phonemes in Sindhi, they can be confusing for Sindhi ESL learners who struggle with the two sounds in English that have the

same meaning. The voiceless inter-dental fricative /θ/ is pronounced as an aspirated voiceless dental stop in Sindhi. However, since this sound is not present in Sindhi phonology, ESL learners have difficulty producing it accurately. Similarly, the voiced interdentally fricative sound /ð/ is replaced by /tʰ/ and /d/ in Sindhi, both of which exist in the language. This is why the sound as in 'then' is also replaced by /d/ in Sindhi. The labio-dental voiced fricative phoneme is another challenging sound for Sindhi ESL learners. It exists in Sindhi as in /həva/ 'wind', but it is articulated differently by English and Sindhi speakers. Studies on Sindhi word stress conducted by Abbasi and Hussain (2015), Abbasi, Channa, Kakepoto, Ali, and Mehmood (2017) suggest that Sindhi does have word stress, but it is not fixed and is weakly quantity sensitive.

Abbasi (2010) conducted a study on 11 problem-posing English consonantal sounds and found that Sindhi ESL learners often face more difficulty with the following sounds: Three voiceless stops: /p/, /t/, and/k/, a voiceless and a voiced inter-dental fricative: /ɵ/and/ð/, a labiodental voiced fricative: /v/, a voiced palatal-alveolar fricative: /ʒ/, two palato-alveolar voiceless and voiced affricates: /tʃ/and/dʒ/, a glide: /w/labio-velar, a liquid consonant: /r/. Abbasi and Hussain (2012) argue the syllable structure of Sindhi is based on five syllable templates and different possible free or bound morphemes in Sindhi.

Additionally, Abbasi and Hussain (2015) argue that Sindhi behaves like a stress accent language as per acoustic data analyzed in the States' Phonetic Laboratory of the University of Illinois Urbana-Champaign. Several other studies on acoustics of vowel quality, duration, and F0 in Pakistani English and Sindhi have been conducted extensively. Abbasi and Hussain (2015) further noted that the evidence presented argues for analyzing Indo-Aryan language in which intonation contours appear to be independent of stress. According to the study (Abbasi & Hussain, 2015) the finding is interesting since it suggests that lexical stress is completely orthogonal to F0 contours unlike in most stress accent languages in which pitch accents dock on the stressed syllables. The quality of voice has been extensively researched in Pakistani English, however, the study based on VOT in Pakistani English in terms of Sindhi ESL learners is not available.

Several studies have been carried out on Pakistani English speech produced by Sindhi ESL learners and their L1. No work is available on VOT study on Pakistani English plosives by Sindhi ESL learners. Abbasi (2018; 2020) explains that the vocal tract of females is smaller in size as compared to males due to which their formant frequencies are higher than males. Abbasi (2018) argues the overall mean of English vowels duration was 75 (ms) for stressed and 66 (ms) for unstressed syllables. The mean difference between stressed and unstressed was 40 (ms) for long vowels and 9 (ms) for English vowels in Sindhi. Abbasi (2017) contends that the mean F1 and F2 values were higher for stressed long vowels and English vowels, while F1 and F2 values were lower for unstressed long and English vowels. However, an acoustic study needs to be investigated in terms of Sindhi Voice Onset Time, or Pakistani English VOT produced by adult Sindhi ESL learners. An acoustic study discovered strong evidence of modification of all phonetic exponents of stress which seems to demonstrate that Sindhi is a stress accent language (Abbasi & Hussain, 2015). Sindhi is an Indo-Aryan language producing VOT in voiced stops as negative or pre-voicing VOT. It does not end here; it goes one step ahead to even transfer a similar phonological aspect to the production of English-voiced stops as negative VOT. However, English-voiced plosives are produced as positive VOT. A normal value for the VOT of English stressed initial /p/ would be between 50 and 60 ms, English initial / b / may have a VOT of about 10 ms (Ladefoged P. J., 2011).

According to Ullah (2011), there are differences in the pronunciation of certain sounds among educated and uneducated Pashtuns. The non-native sound /f/ is pronounced as /p/, while /q/ is pronounced as /k/ by some. Additionally, /ɦ/ and /ʔ/ are mispronounced by uneducated Pashtuns, while educated Pashtuns pronounce them differently in casual conversation. Penzle (1955) categorizes Pashto fricatives as either dental or alveolar, while Bell and Saka (1983) claim that all fricatives are alveolar. They also suggest that certain sounds, including /f/, /ʔ/, /ɦ/, and /q/, are used primarily in formal speech. Archibald (1998) proposes that L2 sounds are easier to learn at the beginning of a word, and Syed (2013) notes that dental stops are common in Pakistani languages, with fricatives being substituted by stops in Indian learners.

Khan (2017) studied six English consonants and compared them to Pashto and Khowar sounds. His findings suggest that it takes time for the tongue's articulatory mechanism to adjust to new sounds, and that the phonemic inventories of Pashto and Khowar differ from English. Therefore, Pashto and Khowar ESL learners may struggle to pronounce certain English sounds. Table 1 illustrates the targeted sounds as follows:

Table 1. Targeted sounds with sound-carrying words used by Khan.

Sounds	**Words**
/ð/	Either
/θ/	Ether
/t/	Seat
/d/	Seed
/v/	Vine
/w/	Wine

Syed (2013) highlighted the significance of context in acquiring a second language, particularly when it comes to specific consonant sounds. According to Syed (2014), the dissimilarities between the first language (L1) and the second language (L2) present difficulties in learning a second language. This gap between L1 and L2 is considered one of the major obstacles to learning a second language. In their 2017 study, Iqbal and Rehman analyzed the consonants of Pashto and English, revealing differences in both the place and manner of articulation. Pashto has certain consonants that are not present in Standard English, such as the dental voiceless plosive /t̪/, dental voiced plosive /d̪/, uvular plosive /q/, velar voiceless fricative /x/, velar voiced fricative /ɣ/, retroflex nasal /ɳ/, and retroflex flap /ɽ/. On the other hand, Pashto retroflex voiceless plosive /ʈ/, retroflex voiced plosive /ɖ/, dental voiceless fricative /s̪/, dental voiced fricative /z̪/, dental nasal /n̪/, dental flap /r̪/, and literal /l̪/ have different places of articulation compared to Standard English consonants. Moreover, Pashto has no labiodental voiceless fricative /f/, labiodental voiced fricative /v/, dental voiceless fricative /θ/, dental voiced fricative /ð/, or Plato alveolar voiced fricative /ʒ/. Although some English consonant sounds have the same manner of articulation, they are pronounced differently in Pashto. Rahman (2012) suggests that learners should use these similarities and differences to help them learn the phonemes of the other language.

Nilsen and Nilsen (2002) provide information on how to minimize language difficulties for students with diverse backgrounds by offering phonetic details and a list of expected challenges based on their first languages. Brown (2000) believes that if the sounds required in English are present in the student's native language, they don't need to be specifically taught. Syed (2013) notes that Pakistani languages use characters for dental fricative consonants (/ð/ /θ/) even though these sounds are not present in those languages. This is because the Arabic alphabet, which Pakistani languages use, contains these sounds (/ð/, /θ/). Rehman, et al. (2012) researched the challenges Pashto speakers face when pronouncing specific English consonants like /f/ and /v/. Fifteen Pashto speakers were recorded while speaking the word aloud, and the results showed that they struggle with the labio-dental voiceless fricative /f/ and labiodental voiced fricative /v/. They replace these sounds with the closest consonants, /p/ and /w/, respectively, as these sounds are not present in Pashto's phonemic inventory.

The purpose of this study is to investigate nine problematic English consonants for Pashto ESL learners through articulatory phonetics and provide them with a more straightforward solution. The study was conducted based on the Contrastive Analysis Theory by Lado (1963), which selected the following problematic consonants: the voiceless labio-dental fricative /f/, the voiced labio-dental fricative /v/, the voiceless dental fricative /θ/, the voiced dental fricative /ð/, the voiced post-alveolar fricative /ʒ/, the voiceless velar stop /k/, the voiceless alveolar ridge stop /t/, the voiced labio-velar approximant /w/, and the voiced alveolar stop /d/.

To evaluate the participants' articulation, a judgmental study was conducted with six participants chosen from different Pashto dialects in colleges and universities in Karachi. The results showed that Pashto speakers found the voiceless labio-dental fricative /f/, voiceless velar stop /k/, voiceless alveolar ridge stop /t/, and voiced alveolar stop /d/ easier to pronounce. However, they struggled with voiced and voiceless inter-dental fricatives /θ/ and /ð/, voiced labio-dental fricative /v/, voiced alveo-palatal fricative /ʒ/, and voiced labio-velar approximant /w/. Pashto ESL learners encounter difficulties in pronouncing these sounds due to the absence of these sounds in their native language and the different sound systems of the two languages. This research differs from previous studies and aims to provide Pashto ESL learners with a more straightforward solution to these problematic consonants.

METHODOLOGY

Participants

The study recruited six native Pashto speakers from Karachi, comprising of three female and three male speakers. These individuals speak different Pashto dialects such as Khilji, Khatak, and Afridi. Their age group ranged from 16 to 28 years old. The data was collected by using purposive sampling technique from various colleges and universities in Karachi, where English was a mandatory subject, and they were proficient in speaking English as a second language. The group included a home tutor, two students from a government commerce college, a Software Engineering student from Aptech Institute, and two students from SMI University, studying in social development and Business Administration.

Stimuli

A group of Pashto speakers were asked to pronounce nine difficult consonant sounds in English. They were given a list of three-syllable words containing the target English consonants /f, v, w, θ, ð, ʒ, k, t, d/ to record at the beginning, middle, and end positions. The list included words like festival, formula, kidnapping, kilogram, together, tragedy, December, dynasty, volcano, victory, wonderful, waterfall, thereafter, there into, therapist, and theater for the initial position. For the middle position, the list included words like uniform, buffalo, leisurely,

lingerie, production, trickiest, strategy, important, dedicate, radio, slavery, deliver, whitewashing, freshwater, furthermore, motherhood, coauthor, and healthier. Finally, for the end position, the list included words like disbelief, waterleaf, decision, confusion, fantastic, magnetic, president, accident, understand, united, digestive, negative, interview, overflow, Leavenworth, commonwealth, interfaith, and underneath. Participants were assigned six words for each sound-two for the beginning, two for the middle, and two for the end - making a total of fifty-two words. Table 2 illustrates nine English problem posing consonantal sounds for Pashto native speakers as follows:

Table 2. Showing nine problem posing English consonantal sounds for Pashto native speakers

S/No	Phonemes	Word-initial	Word-medial	Word-final	Description
1	f	formula festival	uniform buffalo	disbelief waterleaf	labio-dental voiceless fricative /f/ as bilabial voiceless stop /p/ but pronounced correctly
2	ʒ	--------	leisurely lingerie	decision confusion	The post-alveolar voiced fricative/ʒ/ pronounced like a post-alveolar voiced affricate /dʒ/
3	k	kidnapping kilogram	production trickiest	Fantastic magnetic	/k/ is pronounced correctly
4	t	together tragedy	strategy important	president accident	Alveolar stop /t/ is retroflex but pronounced correctly
5	d	December dynasty	dedicate radio	understand united	Alveolar stop /d/ is retroflex but pronounced almost correctly
6	v	volcano victory	slavery deliver	digestive negative	the labio-dental fricative /v/ produced as the approximant /w/
7	w	wonderful waterfall	whitewashing freshwater	interview overflow	the approximant /w/ is produced same as /w/
8	ð	thereafter there into	furthermore motherhood	Leavenworth commonwealth	/ð/ as /d̪/, pronounced like equivalent labial and dental stops
9	ɵ	therapist theater	coauthor healthier	Interfaith underneath	/θ/ as /t̪/, pronounced like equivalent labial and dental stop

Data collection

In a study conducted, six participants were provided with a list of words containing target consonant sounds, pronounced at the beginning, middle, and end of three-syllable words. Participants were instructed to enunciate the words aloud, while the author of the study observed their pronunciation. Thereafter, the chosen consonants were analyzed by carefully examining the method of articulation employed by the participants. The study's findings are expected to offer insights into the dynamics and mechanics of speech articulation, which may be significant for the development of speech therapy programs.

Data analysis

The study presented the findings as a percentage out of 60, as there were six participants. The research identified some consonant sounds that Pashto speakers find difficult to pronounce correctly at different positions of articulations. The speakers pronounced the voiceless labio-dental fricative /f/ correctly. However, those from rural areas who are less familiar with English tend to mispronounce it as /p/. In contrast, all speakers mispronounced the voiceless labio-dental fricative /v/, pronouncing it as /w/. This is because Pashto does not have the /v/ sound, and the glide is pronounced with wide lips in Pashto, whereas in South Asian languages, it is pronounced with rounded lips, resulting in a different glide compared to English. The results, presented as a percentage out of 60 due to the six participants, showed that the exercise was effective. The study found that since there are no words in the Pashto dictionary that begin with the consonant /v/, the /f/ sound is present in the Pashto sound system, but not the /v/ sound. Therefore, it is pronounced with the closest sound to /w/. During the study, it was observed that Pashto ESL learners had difficulty pronouncing certain English words. For example, they pronounced the word "healthier" with a Pashto-voiced dental plosive /d̪/ instead of the correct /θ/ sound. Similarly, they mispronounced the words "coauthor" and "therapist" by adding an aspiration in the voiceless dental plosive /t̪/.

Additionally, they pronounced the /ð/ sound in words like "furthermore", "motherhood", "thereafter", and "there into" as a Pashto voiced dental plosive /d̪/, which is not standard in English. The participants also mispronounced the /ð/ sound in the words "commonwealth" and "Leavenworth" as a Pashto voiceless dental plosive /t̪/ with aspiration. This is because the Pashto sound system does not have the voiceless and voiced dental fricatives (/ð/, /θ/). All of the speakers mispronounced the voiceless dental fricative consonant sound /θ/. They pronounced it as a Pashto voiceless dental plosive /t̪/ which does not exist in English. This mistake occurred in all positions. For example, the /θ/ sound in words like "interfaith", "underneath", and "theater" was pronounced as a Pashto voiceless dental plosive /t̪/. Similarly, "coauthor" and "therapist" were pronounced with aspiration in a voiceless dental plosive /t̪/. Additionally, the /θ/ sound in the word "healthier" was pronounced as a Pashto voiced dental plosive /d̪/. Furthermore, all of the speakers mispronounced the voiced dental fricative /ð/. They pronounced it as a Pashto voiced dental plosive /d̪/, which is not present in Standard English. This mistake occurred in all positions as well. For instance, the /ð/ sound in words like "furthermore", "motherhood", "thereafter", and "there into" was pronounced as a Pashto voiced dental plosive /d̪/. However, the /ð/ sound in the words "commonwealth" and "Leavenworth" was pronounced as a Pashto voiceless dental plosive /t̪/ with aspiration. People who are native Pashto speakers may find it challenging to correctly pronounce these words due to the absence of the voiceless and voiced dental fricatives (/θ/, /ð/) in the Pashto sound system. Table 3 illustrates as follows:

Table 3. Illustrating the judgmental results of the problem-posing sounds

Sounds	Initial level	Medial level	Final level
/f/	60%	60%	60%
/v/	0%	0%	0%
/θ/	0%	0%	0%
/ð/	0%	0%	0%
/ʒ/	0%	0%	0%
/t/	60%	60%	60%
/d/	10%	60%	60%
/k/	50%	60%	60%
/w/	0%	0%	60%

The participants demonstrated accurate pronunciation of the voiceless alveolar stop /t/ in all positions without producing the voiceless retroflex /ʈ/ which was mentioned in previous studies. Additionally, all participants accurately pronounced the voiced alveolar stop /d/ in all positions, though a few participants faced difficulty with the initial /t/ sound in the word "December". Specifically, five out of the six participants pronounced the word "December" with the voiced dental plosive sound /d̪/, instead of the voiced retroflex /ɖ/ that has been reported in earlier studies. Overall, the Pashto sound system includes both voiceless and voiced alveolar stops /t/ and /d/, which were pronounced precisely by the participants.

All of the speakers pronounced the voiceless velar plosive /k/ correctly except for one male speaker who mispronounced the word "kilogram" at the beginning. The speaker mistakenly pronounced the /k/ sound as a /kh/ sound, indicating the presence of aspiration. It should be noted that this aspiration is likely due to the /kh/ sound found in the Pashto sound system, which can occasionally cause mispronunciations. However, despite this isolated incident, the overall pronunciation of the /k/ sound was deemed correct. Pashto speakers have difficulty pronouncing the voiced labio-velar approximant /w/ when it is found at the beginning or in the middle of English words. However, they can accurately produce the sound when it appears at the end of words like "overflow" and "interview," using rounded lips. This is because the /w/ sound in Pashto has a different glide than in English, and hence, South Asian individuals tend to produce it with spread lips. Figure 4 displays the percentage of correct utterances of targeted sounds by Pashto speakers of English.

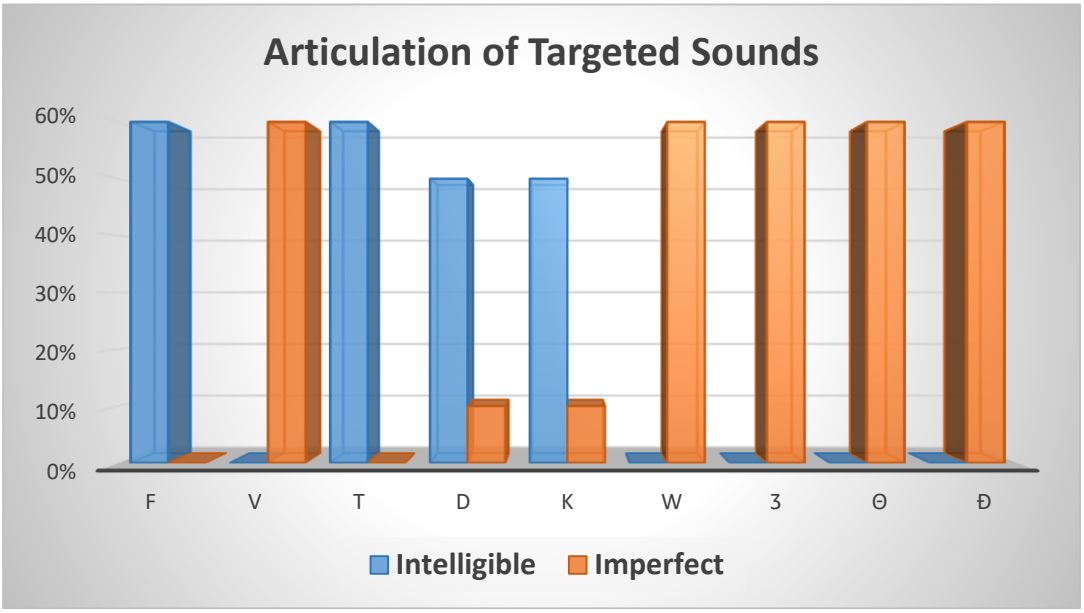

Figure 4. Total occurrences uttered by Pashto native speakers.

DISCUSSION

The study aimed to investigate nine consonantal sounds challenging for Pashto ESL students. The finding of the study is in line with the Contrastive Analysis Theory, since the participants were able to produce similar sounds with some accuracy but had difficulty with sounds that do not exist in the Pashto sound system. The voiceless labio-dental fricative /f/, voiceless velar stop /k/, voiceless alveolar ridge stop /t/, and voiced alveolar stop /d/ were found to be less challenging. On the other hand, the most problematic sounds were the voiced and voiceless inter-dental fricatives (θ, ð), voiced labio-dental fricative /v/, voiced Alveo-palatal fricative /ʒ/ and voiced labio-velar approximant /w/. Other consonants were somewhat less challenging for Pashto native speakers than these sounds. Interestingly, even the teacher was observed mispronouncing some words, indicating a lack of understanding of phonetics and phonology. One of the most common mistakes made by participants was substituting the closest available Pashto sound /w/ for the English sound /v/, which is not present in Pashto. Additionally, the /w/ sound was often mispronounced because it was pronounced with spread lips instead of rounded lips, which is how it is pronounced in South Asian English. Overall, the study revealed that Pashto ESL students struggle with English consonant sounds due to phonological differences between the two languages and the absence of some specific sounds.

CONCLUSION

The present research provides valuable insights into the challenges encountered by Pashto speakers learning English as a second language in articulating specific consonant sounds. By shedding light on the impact of phonological disparities between the two languages, it has been revealed that certain consonant sounds, including but not limited to /θ/, /ð/, /v/, /w/, and /ʒ/, pose difficulties for Pashto learners. These pronunciation challenges, as per Lado's Contrastive Analysis Theory are attributed to inadequate practice and the absence of such sounds in Pashto. The findings of the current study challenge previous research on Pashto speakers, indicating their proficiency in articulating certain English sounds that were previously considered problematic. The study identifies various sounds that presented varying levels of difficulty for Pashto speakers in articulation. While some consonants presented fewer challenges, others,

such as inter-dental fricatives and alveo-palatal fricative /ʒ/, proved more problematic. Moreover, the study highlights the significance of targeted teacher training in ESL instruction. The mispronunciations made by teachers themselves suggest potential gaps in their understanding of phonetics and phonology. Furthermore, the impact of phonological differences between English and Pashto sound systems is underscored by the prevalent substitution of English /v/ with the closest Pashto sound /w/.

In conclusion, the research underscores the need for comprehensive training programs that address specific pronunciation challenges encountered by Pashto speakers learning English as a second language. The implications of the study extend beyond Pashto speakers, emphasizing the broader importance of tailored ESL instruction for learners from diverse linguistic backgrounds. Ultimately, enhancing phonetic awareness and providing targeted practice opportunities are crucial for overcoming pronunciation difficulties in the ESL context.

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