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Phonemic Modification Strategies Used by Pahari ESL Learners while Learning English Consonant Clusters

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Abstract

The current study attempted to examine different modification strategies used by Pahari ESL (English as Second Language) learners. Pahari ESL learners use different types of modification strategies to acquire consonant clusters that are not found in their native language. The data was collected by providing a list of 216 words which were various combinations of the place of articulation and manner of articulation. About 10 participants were selected from the district Bagh. The participants belonged to intermediate academic background. The learners were asked to pronounce those clusters three times. These recordings were analyzed by using Praat software. For acoustics analysis, three participants were selected from them. The current study showed that Pahari learners use deletion, lenition, and fortition as modification strategies to deal with the consonant clusters that are not found in their language. This study further indicated that learners used spirantization, approximentization, voicing, change in manner, stopping insertion of consonants, devoicing, and lengthening of vowels as well.

Keywords*:* Approximantization, consonant clusters, fortition, lenition, spirantization

Introduction

English and Pahari are two distinct languages with defined phonological and syllable structural patterns. When Pahari speakers learn English, they struggle with consonant clusters. The current study attempted to examine the Pahari (English as Second Language) ESL learners' phonemic modification strategies while learning English consonant clusters.

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Jabeen et al. (2012) stated that English is the most used language for communication purposes and has also acquired the status of lingua franca. Saidat (2010) stated that it is the language of trade, technology, diplomacy, business, and communication. Graddol (2006) predicted that the number of English language users would increase to two billion in 10-15 years. Kachru (1990) categorized English speaking countries into three classes according to English's role in these countries. It was also explained that the learners transferred their first language structure and linguistic habits into English while learning the respective language. Since the 1980s, Erling and Bartlett (2006) has been using the term "World Englishes" to describe the indigenous characteristics of English language. He stated that these are recognized varieties and have the flavor of ten local languages because the features of native languages are present in these varieties. Crystal (2004) stated that these varieties have different grammatical, phonological, and lexical features.

The syllable structure of English language poses pronunciation problems for Pahari ESL learners. Maximum three consonants are present at onset and four consonants at coda positions. According to Khan (2012), Pahari language allows maximum two consonants at both, onset and coda positions. Three and four consonant clusters are not found in Pahari language. Therefore, Pahari speakers face difficulties in acquiring these clusters. When Pahari learners learn English, they adopt certain phonemic modification strategies (for instance fortition, deletion, and lenition) in dealing with clusters that are not present in their language. Therefore, the current study attempted to determine phonemic modification strategies used by Pahari ESL learners to learn English consonant clusters.

Literature Review

According to Chomsky (1981), the consonant cluster is a distinct feature of many languages. Jones (1976) stated that a consonant cluster is the combination of consonants found in a syllable without intervening vowels between them. Consonant clusters or sequences are of two types, that is, intrasyllabic and intersyllabic clusters. The cluster present in a single syllable is called intrasyllabic cluster, for instance /pr/ in ‘pray’. The cluster which is a part of two different syllables in a word is called intersyllabic cluster, such as /kt/ in ‘doctor’. Maddieson (2005) stated that language is categorized into three types based on syllable complexity, namely simple,

moderately complex, and complex syllables. Plank (2009) also modified the classification of syllable structure based on complexity.

Lee (2008) stated that second language learners faced problems in learning the clusters of English language at both onset and coda positions. This is because the phonetic features of their native language are not similar with that of English. The phenomenon of breaking the clusters or phonological change is found in most languages. Nguyen (2008) states that Vietnamese (language) does not have consonant clusters like English. Moreover, Vietnamese use deletion and changing features as their most common modification strategies.

In Japanese, language consonant clusters are absent. These learners break the English consonant clusters and insert a vowel between them. Similarly, Japanese speakers inserted "/ʊ/ or /o/" sounds after the final consonant of every syllable, except nasal sounds. The insertion in loan words in Japanese may have certain possibilities. The first possibility may be due to speech production. These learners may have failed to develop the ability to articulate the clusters of consonants. Therefore, they apt the modification of vowels in order to trigger the most practiced CV motor program". The orthography may be a possibility as well (Dupoux et al., 1999).

Chang (2004) studied Chinese learners' syllabification of English consonant clusters. He stated that the syllabification errors were due to first language influence and developmental factor. Negative transfer may be another factor as well. The CCVC clusters were modified to CVC and CCC clusters were reduced to either CVCC or CCVC. In most cases, the errors were caused by deletions, epenthesis, or coalescences of the words.

Kim et al. (2005) stated that Korean speakers tend to insert vowels in English words with consonant clusters. In the interlanguage phonology of Korean English speakers, vowel epenthesis is used not only in consonant clusters, however, also in syllables that have fricatives or affricates or even stops, preceded by diphthongs.

Saidat (2010) stated that Arab English learners faced difficulty while learning certain English syllables. They inserted a short high front vowel /ɪ/ for cluster de-clustering. For instance, splash and spleen are pronounced as /sɪblʃ/ and /sɪblɪ:n/. ESL students applied different strategies to tackle the

problem of adapting clusters depending on their native language. Spanish speakers apply prothesis to deal with initial /s/ clusters (Carlisle, 1994).

Al-Otaibi (2021) examined the phonological analysis of L2 coda clusters produced by Saudi Arabic second language (L2) English learners. The results showed that L1 language (Arabic phonology) influenced the production of targeted clusters. Arabic language allows coda clusters but these speakers modified the clusters by either epenthesis or deletion. Sound assimilation was observed in some sounds which were absent in L1 phonemic inventory.

The study conducted by Mir and Afzal (2022) determined the interlanguage syllabification by Hindko speakers. They studied stop clusters at the word medial position. It is important to note that speakers used epenthesis and ambi-syllabicity and these two processes were conditioned by faithfulness and markedness constraints. There is a wide range of ways in which different cluster types can be resolved (Fleischhacker, 2005).

Types of Simplification or Modification

During the learning of consonant clusters, the syllabification process occurs in different ways as given below.

Cluster Reduction

Cluster reduction is a process that deletes one or more consonants from a syllable cluster so that only one single consonant occurs at the margin, for instance, /blue/ is pronounced as /bu/ (Grunwell, 1987).

Cluster Simplification

Grunwell (1987) states that this type of error occurs when two or more elements in a cluster are pronounced differently from the target phoneme. For instance, /green/ is pronounced as /gwin/; /bread/ is pronounced as /bwed/.

Epenthesis

According to Dyson and Paden (1983), epenthesis refers to the insertion of some vowels between elements of cluster (usually a schwa), for instance, /draɪv/ is articulated as [dəraɪv]. According to Jabeen et al. (2015), "the insertion of lax vowel" is called vowel epenthesis. There are two types: "prothesis and anaptyxis". "Prothesis is the insertion before cluster

and anaptyxis refers to the insertion to break consonant clusters".

Metathesis

Pyles and Algeo (2010) listed those sounds can be rearranged during metathesis. They observed that old English sounded differently when pronounced /wæspe/ as /wæpse/. There is an interchange of /p/ and /s/ sounds. Ultan (1978) stated that the "superficial cause of most metathesis was the conversion of a phonologically disfavored sequence of sound into an acceptable one".

Lenition

Honeybone (2012) stated that lenitions include 'spirantization' (a segment becoming a fricative, e.g., p becoming f), 'approximantization' (becoming an approximant, e.g., d becoming ð), 'debuccalization' (losing oral articulation to become a glottal, e.g., x becoming h), and 'voicing' (a change in laryngeal features, e.g., s becoming z, also describable as 'fortis' becoming 'lenis'); segmental loss is sometimes included in their number, too." (p. 1)

Fortition

Fortition refers to "any phonological process in which some segment becomes stronger (more consonant-like). For instance, the changing of glide /j/ into some kinds of fricative, affricate or plosive are found in most varieties of Basque into" (p. 149).

No work has addressed the strategies of phonemic modification used by Pahari ESL learners while learning English consonant clusters. It is observed that different modifications are used by Pahari learners in the interlanguage structure of syllables. They face problems in the articulation of those words. Besides epenthesis, they apply different strategies, such as deletion, lenition, metathesis, and fortition. These modifications re-syllabify the English syllable structures.

Research Methodology

Research Design

The current study employed both qualitative and quantitative methods. The learners were given a word list and asked to pronounce it three times.

The study also employed fieldwork where learners are observed how they speak English. Moreover, acoustic analysis was also conducted to confirm different modification strategies used by speakers. Therefore, this was a quantitative study as well.

Participants

About ten participants (5 females and five males) were selected for this study. All of them belonged to District Bagh, Azad Kashmir. Three speakers were selected for acoustic analysis from them. All the learners had at least intermediate level qualification and aged between 17-25, because it could not be said that they were at the beginning level of learning English language.

Stimuli

The learners were given a list comprising 216 English words and they pronounced these words three times. This word list consisted of two examples of each cluster type. These clusters represented different combinations of both manners and places of articulations. Different types of clusters are given in the following table and examples are given in the Appendix.

Table 1

Types of Clusters

CC ONSET CLUSTERS		
Voiced stop+ liquid	Voiceless stop + liquid	Fricative + nasal
Fricative + stop	Fricative + glide	fricative + semivowel
Fricative + liquid	Stop + semivowel	stop+ glide
CCC ONSET CLUSTERS		
Fricative +stop + nasal	Fricative +stop + liquid	
CC CODA CLUSTERS		
Nasal +voiceless alveolar stop	Nasal +voiceless bilabial stop	Nasal +voiced alveolar stop
Voiced bilabial stop + VBS	Nasal +fricative	Voiceless stop +voiceless stop
Voiced bilabial stop + fricative	Fricative + fricative	Fricative + nasal

Affricate + stop	Voiceless alveolar stops+ fricative	Nasal +affricate
Fricative +fricative	Fricative + stops	Liquid + fricative
Liquid + stops	Glide +stop	Liquid +nasal
Stop + nasal	Nasal +liquid	Stop +liquid
CCC Coda Clusters		
Nasal +stop +fricative	Nasal +stop +stop	Liquid +stop +fricative
Stop+fricative+stop	Stop+fricative+fricative	stop +stop+fricative
Fricatives+stop+fricative	Liquid+fricative+stop	Liquid+nasal+stop
Liquid+stop+stop	Liquid+fricative+fricative	Liquid+nasal+fricatives
Nasal +stop+fricative	Fricative +liquid +fricative	Nasal+fricative+stop
CCCC Coda Clusters		
Nasal+stop+fricative+stop	Liquid+fricative+fricative-fricative	Liquid+fricative+fricative +fricative

Data Collection

Praat software (version 4.3) was used to record and analyze the data. A high-quality head phone and Del laptop were used for recordings. The data was recorded in a silent place to avoid noise. Acoustic analysis was carried out to determine different types of modification strategies. Praat software was used to extract all 216 tokens from the initial wav file. Afterwards, an automated Text Grid file was opened to segment and label each extracted token. The Text Grid file was then loaded into the Praat object window along with the token's waveform and spectrogram. The preliminary segmenting points were adjusted manually. Depending on both audio and visual cues, the segmentation was conducted to determine different types of modification strategies used by the speakers. F1, F2, and duration were calculated to find different types of modifications.

Results and Discussion

According to Grunwell (1987), cluster reduction is the process in which one or more consonants are deleted from the target clusters so that only one single consonant occurs at syllable margins, for instance /blue/ is

pronounced as /bu/. Bayley (1996) stated that there is no inflectional morpheme in Mandarian language and these language learners used deletion as a simplification strategy when the cluster was in preterit form.

Lass (2010) stated that deletion occurs in three different ways, which are as follows. He said that "Aphaeresis" is the deletion that occurs at initial stage. For instance, in English, "I am" is sometimes written as "I'm." "Syncope" is the deletion that takes place at the internal position, and most frequently, this term is used for the loss of the vowel but few linguists used it for consonant loss as well. "Apocope" is the loss of final elements. Pahari ESL learners also employ these three kinds of deletion.

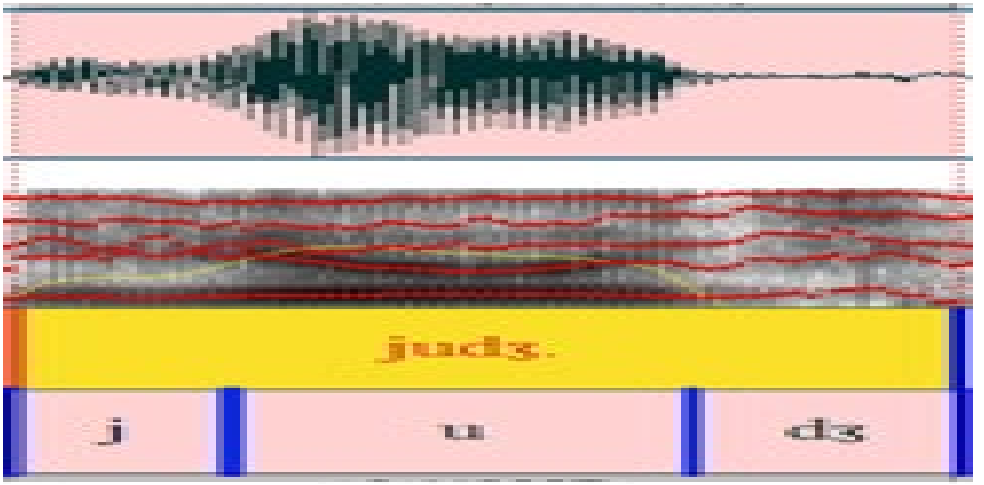
Aphaeresis

Aphaeresis is employed by learners in /h/ and /j/ clusters. The cluster /hj/ is not present in Pahari language initially. The initial deletion of /h/ sound does not affect the syllabification of words.

Words	RP Transcription	Pahari Transcription
Human	hjumən	jumən
Huge	hjudʒ	judʒ

Figure 1

Deletion of /h/ in /hjudʒ/



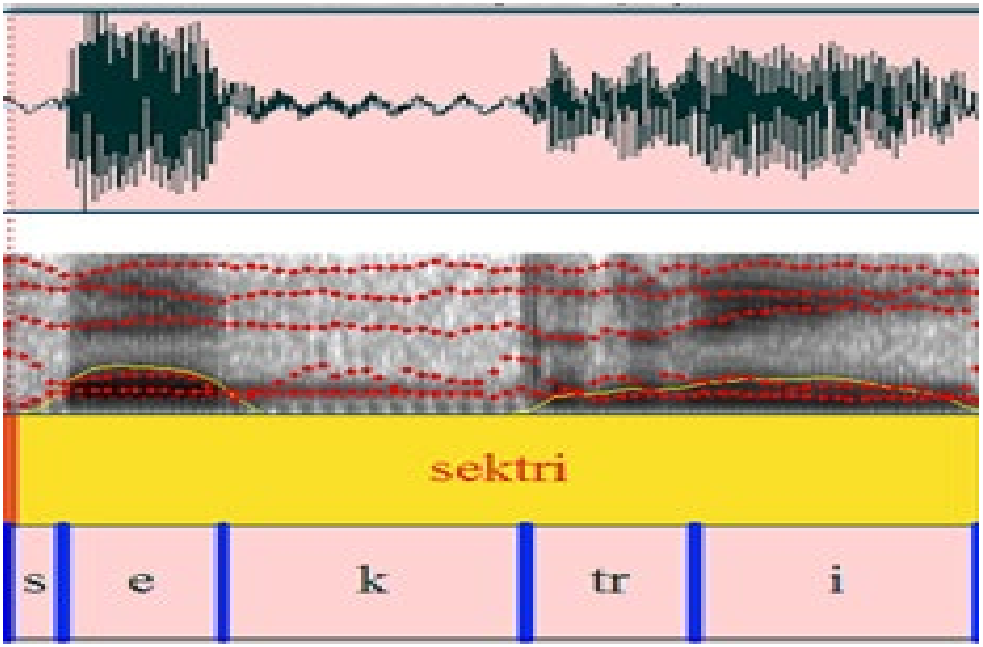
Syncope

Pahari learners also use syncope as described in the examples below. The three syllabic words are syllabified as two syllables. Both consonant and vowel sounds are omitted at the internal position, resulting in the re-syllabification of words.

Words	RP Transcription	Pahari Transcription
Laboratory	ləbɒrətri	leba:tri
Secretary	sekrətri	sektri

Figure 2

Deletion of /rə/ in word /sekrətri/



The sound /j/ is also deleted in the examples given below.

Words	RP Transcription	Pahari Transcription
Cellulose	seljələ(r)	selu:lər
Cellulose	seljuləʊs	selulos
Vocabulary	vəkæbjələri	vəkæbləri
Manufacture	mænjufæktʃə(r)	mænifæktʃər

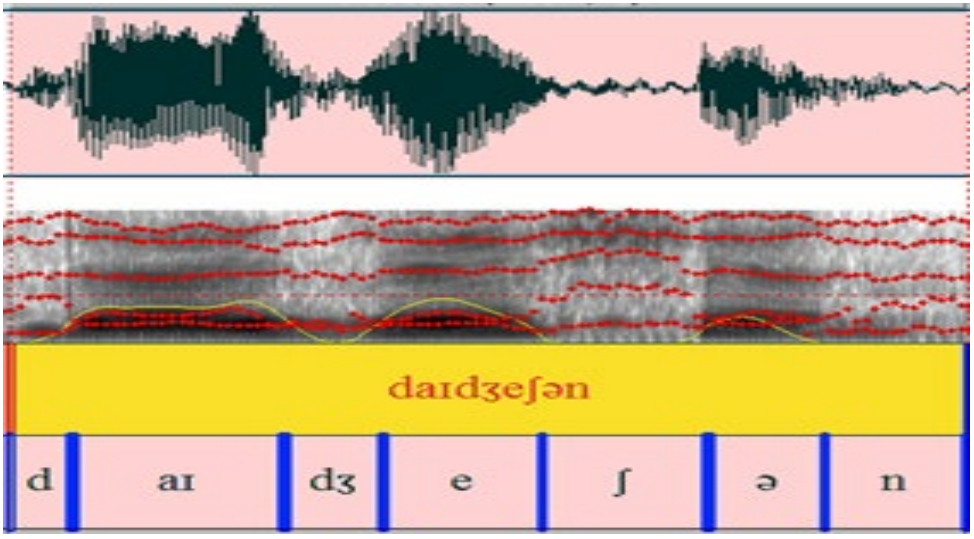
Deletion of /s/ sound is shown in the examples given below.

Words	RP Transcription	Pahari Transcription

Suggestion	sədʒestʃən	sədʒeʃən
Digestion	daɪdʒestʃən	daɪdʒeʃən

Figure 3

Deletion of /s/ in word / daɪdʒestʃən/



Apocope

Apocope is also employed by learners to tackle three and four-consonant clusters at coda position.

Nasal+ Plosive+ Plosive and Nasal + Plosive+ Plosive+ Fricative Clusters

Pahari speakers deleted /p/ sound in /mpt/ clusters and in case of /nasal plosive plosive fricative/ combinations both /p/ and /s/ sounds are omitted

Words	RP Transcription	Pahari Transcription
Attempt	ətempt	ətemt
Tempt	tempt	Temt
Attempts	ətempts	ətemt
Tempts	tempts	Temt

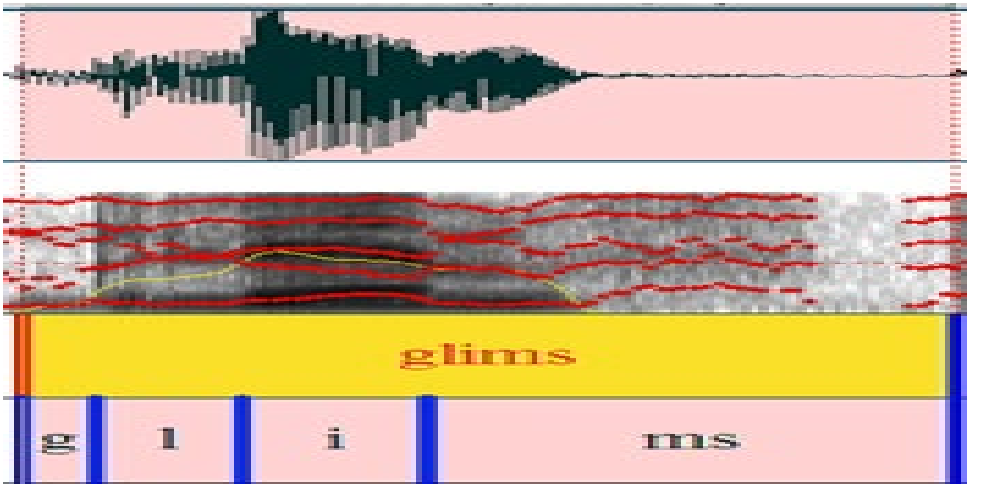
Nasal +Stop + Fricative Clusters

The /p/ sound is deleted in this combination of clusters.

Words	RP Transcription	Pahari Transcription
Glimpse	glɪmps	gɪlms
Limps	lɪmps	lɪms

Figure 4

Deletion of /p/ in word /glɪmps/



In these examples /p/ is deleted.

Lateral+Fricative+ Fricative and Lateral+Fricative+ Fricative+ Fricative.

In case of /lfθ/ and /lfθs/ clusters /f/ and /s/ are deleted and /ksθ/ or /ksθs/ combinations /s/ is deleted.

Words	RP Transcription	Pahari Transcription
Twelfths	twelfθs	tʊvelt̪^{h}
Twelfth	twelfθ	tʊvelt̪^{h}
Sixths	siksθs	sikt̪^{h}
Sixth	siksθ	sikt̪^{h}

Similarly, /ŋ/ sound is deleted in /ŋkts/ clusters. For instance, /ɪnstɪŋkts/ is pronounced as /ɪnstɪkt/.

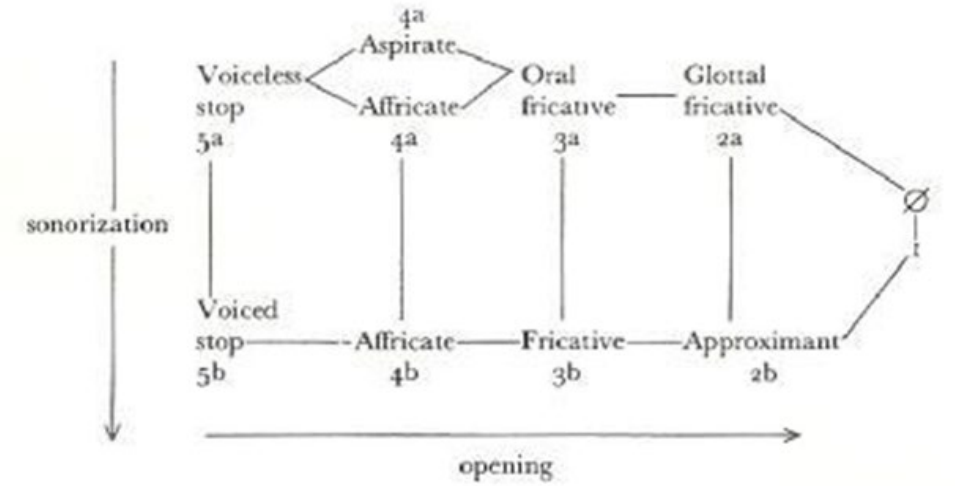
Lenition

According to Trask (2000), "lenition is a phonological process that weakens the articulation of consonants" between vowels or consonants at

the ends of syllables. This process causes the consonants to be voiced, deleted or spirantized.

Lass (2010) stated that "aspiration and affrication" (given in scale below from "5a to 4a and 5b to 4b") are the cases of lenition. He also represented "debuccalisation" to "[h] (3a to 2a)" as the process of lenition. He also included the changes in laryngeal and manners as two types of lenitions. The scale of lenition is given below.

Figure 5



Note. Lass, 1984, p. 178

He also differentiated between lenition and fortition in terms of two length scales given above. One is openness and the other is sonority movement. "The movement down the first involves decreased resistance flow, and movement down the second involves an increase in the output of periodic acoustic energy. So, the above figure shows that down and or right is lenition and up and or left is fortition".

This process is used in many languages. Honeybone (2001) stated that lenition is present in the variety of English spoken in Liverpool and adjacent areas in the northwest of England. For instance, the word expect is produced as "/exspext/".

According to Giannelli and Savoia (1979), Florintine speakers faced problems in uttering voiceless stops which are present at intervocalic

position. The voiceless stop sounds /p,t,k/ are lineated in this language, for instance, word /kasa/ is produced as "/xasa/". In this example, the sound /k/ is lineated into sound /x/. The word "/tavola/" is uttered as "/θavola/". The voiced velar stop is lineated. Similarly, the word /gamba/ is produced as "/ɣamba/".

The consonantal lenition is also present in the variety of English spoken by Pahari learners.

Voiced Less to Voiced Sound

Modification of /s/ to /z/

Lenition is also employed by Pahari speakers when they speak English. These speakers changed the fricative voiceless /s/ into voiced /z/. Few examples are given below.

Words	RP Transcription	Pahari Transcription
Conservation	kənsɜ:vʃn	kənzærvʃən
Insert	ɪnsɜ:t	ɪnzært
Forensic	fərensɪk	fərenzɪk
Hypothesis	haɪpɒθəsɪs	haɪpoʈʰɪsɪz

Trask (2000) stated in his dictionary of Historical and Comparative Linguistics, that lenition or weakening is a phonological change in which a segment shifts its character. It means that it becomes less consonant-like than before. He stated that any change in character from left to right, along any of the scales given below, may be regarded as a lenition.

6	5	4	3	2	1	Weak
						Ø
Voiceless Stops	voiced stops voiceless fricatives	Voiced Fricatives	Nasals	liquids	Glides	

Note. Trask, 2000

Modification of Fricative /ʃ/ Sound to /j/

Pahari speakers shifted its character from /ʃ/ (voiced fricative) to /j/ (glide) in fricative /ʃ/ and nasal /n/ combinations. This type of modification is shown in the examples given below.

Words	RP Transcription	Pahari Transcription
Conversion	kənvɜ:ʃn	kənvərjən

Diversion	daɪvɜ: ʃn	daɪvərjən

Modification of Affricate /tʃ/ to /ʃ/ Sound

The example given below showed that /tʃ/ sound is lineated to the sound /ʃ/ by Pahari learners. Two types of modifications occurred in these examples, that is, voiced less affricate /tʃ/ is modified into voiced fricative /ʃ/. So, change in manners also occurred here.

Words	RP Transcription	Pahari Transcription
Digestion	daɪdʒestʃən	daɪdʒeʃən
Suggestion	sədʒestʃən	sədʒeʃən

Manner Change

Learners also modified the sound /ʒ/ to sound /dʒ/ at the coda position. The data showed that the place of /ʒ/ and /dʒ/ remained the same, however, the speakers brought a change in the manner of articulation because the sound /ʒ/ is fricative and /dʒ/ sound is affricate.

Words	RP Transcription	Pahari Transcription
Mirage	mɪrɑ:ʒ	mɪrɑ:dʒ
mélange	meɪlɑ:nʒ	meɪˈlɑ:ndʒ

Spirantization

Kirchner (1998) stated that spirantization is a process in which "stop or affricate sounds changed to fricative or approximant continuant". According to Martínez (2008), this process is also present in modern Hebrew. The stop sounds "/b/, /p/, and /k/" changed to their fricative counterparts /v/, /f/, and /X/, in allophonic distribution. For instance, "/paras/ (Past 3p.sg.m)" is modified into "/lifros/ 'spread' or /efros/ 'I will spread" **(**Tannenbaum, 2005).

Modification of Glide /w/ into Fricative /v/ Sound

The glide /w/ sound is not present in Pahari language. The learners modified the glide /w/ into fricative /v/ sound. A few examples are listed below.

Words	RP Transcription	Pahari Transcription
Gwin	gwɪn	gɪvɪn
Twist	twɪst	tɪvɪst

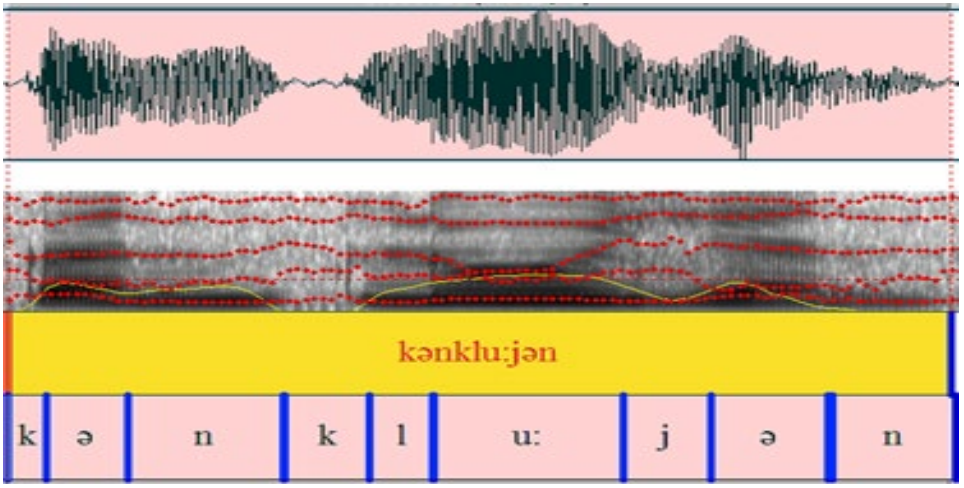
Approximantization

This modification strategy is also implied by Pahari speakers. The sound "ʒ" is not present in Pahari language. So, this sound is modified into approximant "j".

Words	RP Transcription	Pahari Transcription
Conclusion	kənklu:ʒn	kənklu:jən
Transfusion	trænsfju: ʒn	trænsfju:jən

Figure 6

Modification of /ʒ/ to /j/ Sound



There is no effect of lenition on the syllabification of the word. When other processes of modification, such as insertion and deletion occur along with lenition, then re-syllabification occurs.

Fortition

According to Trask (2000), fortition is the phonological process that strengthens the articulation of consonants at the start of syllables by forming stops or devoicing. Mobaraki (2013) also examined the processes of fortition in standard Persian and its few dialects. He included lengthening, vowel insertion, consonant insertion, devoicing, and aspirations as five processes of fortition. Persian learners of English inserted commonly two consonant glides, that is, /w/ and /j/ between the two vowels for ease of articulation. The examples given below show insertion of /w/ and deletion of /h/.

"/kuh + o + da ʃt / [kuwo daʃt]" "mountain and plain"

"/deh + o + ʃahr/ [dewoʃa:r] " "village and city" (Mobaraki, 2013).

Stopping

In Pahari language, the consonants /θ/ and /ð/ are not present. Pahari learners changed the fricative /θ/ and /ð/ in to /t̪ʰ/, /d̪/ stops. Some examples are given below.

Modification of θ Sound into t̪ʰ

Words	RP Transcription	Pahari Transcription
Three	θri:	t̪ʰri
Thread	θred	t̪ʰred

Modification of ð into d̪

Words	RP Transcription	Pahari Transcription
Baths	bɑðz	bɑd̪z
Soothes	su:ðz	su: d̪z

Devoicing

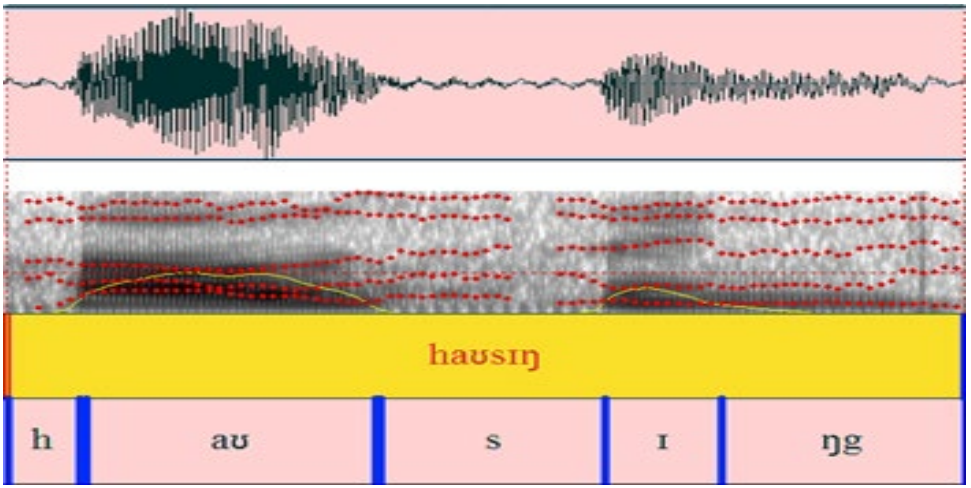
Mobaraki (2013) stated that devoicing is also a type of fortition. He studied this process in Persian language. For instance, Persian speakers pronounced /Gɑb/ as /Gɑdɑm/. In this example, /b/ is changed into /d/. Fortition is also employed by Pahari speakers, but devoicing is rarely used by them. Few examples are given below.

Words	RP Transcription	Pahari Transcription
Attache	ətæʃeɪ	ətætʒeɪ
Negotiation	nɪgəʊʃieɪʃn	nɪgosieɪʃən

Modification of /z/ to /s/

Words	RP Transcription	Pahari Transcription
Muslim	mʊzlɪm	mʊslɪm
Housing	haʊzɪŋ	haʊsɪŋ

Figure 7
Modification of /z/ to /s/ Sound



In these examples, they modified /ʃ/ to /s/ and /tʒ/ and /z/ to /s/ sounds.

Consonants' Insertion

In English language, /g/ sound is silent at coda position in /ŋg/ clusters. In Pahari language, /ŋg/ cluster is present. So, they pronounced it.

Words	RP Transcription	Pahari Transcription
Thing	θɪŋ	t̪ʰɪŋg
King	kɪŋ	kɪŋg

These examples showed insertion of g consonant in Pahari language.

Lengthening

Mobaraki (2013) classified "Lengthening" as a kind of fortition. This process is also used in Persian. For instance, "/menɑr/ and /lebɑs/" are produced as "/munɑr/ and /lubɑs/". In these examples, the mid vowel in the first syllable and the back vowel in the second syllable assimilated with each other in [+back] feature, that is, /u/ vowel.

Lengthening of vowels is also used by learners to learn English. If monosyllabic words consisted of short vowels in English, Pahari speakers modified it into long vowels.

Words	RP Transcription	Pahari Transcription
Dusk	dʌsk	desk
Bulb	bʌlb	belb

When a word starts with short vowel /ə/ or /ɪ/, they lengthen the vowels. If this vowel is followed by /b/ sound, it is changed into /æ/ and in case of /k/ it is changed into /e/ sound.

Words	RP Transcription	Pahari Transcription
Absorb	əbsɔrb	Æbzarb
Abrupt	əbrʌpt	Æbrept
External	ɪkstɜ:nl	ekstɜ:nel
Explosion	ɪkspləʊʒn	eksplojən
Except	ɪksept	Eksep

Fortition also has no effect on the syllabification of the words.

Conclusion

In conclusion, Pahari ESL learners employ various modification strategies to cope with different consonant clusters in English. Lenition involves changes from voiceless to voiced sounds, such as fricative voiceless /s/ is changed into voiced /z/, ʃ to ʒ in fricative ʃ and nasal n clusters. While, spirantization, Approximantization, and manner change are also used. Fortition strategies include voicing, lengthening, and consonant insertion. Lenition and fortition have no effect on the syllabification of the words. The re-syllabification of words occurs when there are other processes along with lenition and fortition. Many languages contain consonant clusters. Therefore, the current study concluded that learners employed different modification strategies in the acquisition of consonant clusters of a second language which are not found in their language.

The study identified a research gap and suggested the expansion of investigation to other districts. It also explored modifications in the acquisition of overall sound system of a second language. It also has

implications for researchers studying interlanguage syllabification in other languages.

Conflict of Interest

The authors of the manuscript have no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

The data associated with this study will be provided by the corresponding author upon request.

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Appendix

CC Onset Clusters

Voiceless stop + liquid	Voiced stop+ liquid	Fricative + liquid
Precursor	Bless	Flourish
prejudice	Blue	flask
Plausible	Blinking	Frequent
Plagiarism	Glue	Frightened
Clue	Grumble	Slaughter
Crew	Grim	Shrinkage

Fricative + nasal	Fricative + glide	stop+ glide
Smuggling	Thwart	Gwen
Snobbish	Swollen	Gwendolen
		Tweek

Fricative + stop	Stop + semivowel	fricative + semivowel
Speaker/spectacles	Pew	Few, Suit
Steel/standardize	Beauty	View
School/scheme		Huge

CCC Onset Clusters

Fricative +stop + liquid	Fricative +stop + nasal
Spring	Squall
String	Skew
Struggle	

CC Coda Clusters

Nasal +voiceless bilabial stop	Nasal +voiceless alveolar stop	Nasal +voiced alveolar stop
Bump	Dreamt	Aimed
Camp	Ant	Roamed

Nasal +fricative bilabial stop + VBS	Voiceless stop +voiceless stop	Voiced
Comes	Abrupt	Absorbed
Terms	Except	Bribed

Voiced bilabial stop + fricative	Fricative + fricative	Nasal +fricative
Cabs	Fifth	Hence
Shrubs	Beliefs cliffs	Month

Affricate + stop	Nasal +affricate Voiceless alveolar stops +fricative	
Lunched	Change	Meets
Pinched	Hinged	Width

Fricative +stop Liquid + stop	Fricative + fricative	
Believed	Beliefs	Help
Bathed, Dusk	Oaths	Difficult

Liquid + fricative +liquid	Glide +stop	Nasal
Self	Measured	Criminal
Health		
Else		

Liquid +nasal +liquid	Stop + nasal	Stop
Film	Button	Principal
Horn		Cycle

Fricative + nasal
Equation

CCC Coda Clusters

Nasal +stop +stop +stop +fricative	Nasal +stop +fricative	Liquid
Lumped Trumphed	Almonds Nymphs Filched	Worlds Bulbs
Stop+fricative+stop +stop+fricative	Stop+fricative+fricative	stop
Welshed Midest	Depths Sixths	Opts Instincts
Fricatives+stop+fricative Liquid+nasal+stop	Liquid+fricative+stop	
Crafts Thirsts	Pursed Elfed, Welshed	Filmed
Liquid+stop+stop Liquid+nasal+fricatives	Liquid+fricative+fricative	
Helped Bulbed Bilged	Delved Tilths	Kilns
Nasal +stop+fricative Nasal+fricative+stop	Fricative +liquid +fricative	
Bends Hints	Treasures	Hinged

CCCC Coda Clusters

Nasal - stop +fricative+stop	Liquid –fricative-fricative-fricative
Chintzed Glimpsed	Twelfths

Liquid+stop-stop+fricative
Mulcts