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RESEARCH PAPER

Experimental Evidence of Syllabification of /sC/-Clusters at Onset Position by Kashmiri Speakers in Pakistani English

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ABSTRACT

The current study investigates the syllabification of sC-clusters at onset position in Pakistani English by Kashmiri speakers. The main objective of the study was to explore the syllable boundary syllabification of sC-clusters by Kashmiri speakers in Pakistani English context. The study uses real disyllabic and tri-syllabic words with sC-clusters at onset position as stimuli for the data. The participants were asked to produce the stimuli. The Praat analysis was used to study the spectrographic features of sC-clusters at onset position in Pakistani English. The results of the study show that proceeding vowel length, cluster sonority, and edge constraints have significant effects on the syllabification of sC-clusters at onset position in Pakistani English produced by Kashmiri speakers. In addition, data shows that phonological and morphological structure of Kashmiri language (L1) influence s-clustering in Pakistani English. The study also shows that Kashmiri English speakers break the sC-clusters at onset position and generate the process of epenthesis, which is an evidential sign that CC clustering in Pakistani English by Kashmiri speakers is influenced by L1. The study recommends an interlanguage syllabification based on extra-linguistic variables for further in-depth exploration.

KEYWORDS CC Clusters, Epenthesis, Onset Position, Pakistani English, Syllabification

Introduction

Sustainability Kashmiri is a language spoken in the Jammu and Kashmir region. Syllabification has been explored by different linguists in different languages: Clements (1990) studied the core of syllabification; Schiller (1997) investigated syllabification in Dutch; Btoosh (2006) explored constraint interaction and phonotactics on syllabification; Park (2008) studied syllabification in the French language; and Daana (2009) investigated syllabification in Jordanian Arabic. However, studies lack material data on syllabification in Pakistani English used by Kashmiri speakers. The current study focuses on investigating the syllabification of /s/ clusters at onset position by Kashmiri speakers of English in a Pakistani context. The study explores /s/ clusters in CC clusters and CCC clusters with lax and tense vowels.

Literature Review

Consonant clusters are a distinguishing feature of most languages around the world, and many linguists have studied them from a phonological and morphological standpoint. Jones (1976) explains that consonant clusters are sequences of consonants without a vowel at the onset or coda position of a syllable. Kenstowicz (1986) describes that vowels may serve to ensure the sonority sequence in any language; however, he didn't provide empirical evidence for his claim. On the other hand, Clements (1990) states that consonant clusters in any language are ordered according to the sonority sequence. He states that the peak is the most sonorous element in a syllable, and as we go apart from the peak, sonority decreases. Clements (1990) describes the sonority sequence order as:

Stops < Fricatives < Nasals < Liquids < Glides < Vowels (Clements,1990)

Roach (2002) briefly discusses the consonant clusters in English based on structural conventions. Roach (2002) states that the maximum number of consonants at onset position in English is three, which means a maximum of three CCC can occur together, and he further adds that the third element will be /s/ in a CCC cluster. Roach (2002) also adds that the maximum number of consonants in coda position is four in English. In addition, Duanmu (2009) discusses the consonant clustering in English based on phonotactics. Duanmu (2009) also says that the initial /s/ can be excluded from the cluster. However, on the basis of CVX theory, all coda clusters can be explained by affixes (Duanmu 2009: 171–181). Gazzalie (2019) states that the Kashmiri language has a (c) (c) v (c) (c) syllable structure. She also claims that word initial consonant clusters are less common in Kashmiri than word medial or word final position. So, because of the lack of consonant clustering at word initial position in the Kashmiri language, speakers face problems while pronouncing English consonant clusters at onset position. The current study aims to investigate the /s/ clustering in English among Kashmiri speakers.

Material and Methods

The researcher recorded all of the participants while they were reading the word list with /s/ clusters at the beginning. A total of 20 words were recorded from 10 participants, resulting in 200 tokens. The participants were five males and five females with matriculation degrees. The matric participants were selected to reduce the influence of advanced-level English and to find factual data about L1 influence on /s/ cluster syllabification in English. The data from the 10 Kashmiri speakers of English was collected by the researcher using the following stimuli:

Table 1
Stimuli list used for data collection
CC & CCC clusters at onset followed by the vowel

	Words	**CC cluster** followed by the **Vowel**	**Environment**
/sp/	**Spoon, speak**	**/i:/ & /u:/**	**Tense & Tense**
/st/	**Stick , star**	/ɪ/ & /a:/	**Lax & Tense**
/sk/	**Skull, skeleton**	**/ ʌ/ &** /ɛ/	**Lax & Lax**
/sl/	Slam, slow	/a:/ & /au/	**Tense & Tense**
/sm/	**Small, smooth**	/ɔ:/ & /u:/	**Tense & Tense**
/sn/	**Snail, snow**	/eɪ/ & /əʊ/	**Tense & Tense**
/spl/	**Split, splash**	/ɪ/ & /a:/	**Lax & Tense**
/str/	**Strategy, strawberry**	/a:/ & / ɔ:/	**Tense & Tense**
/skr/	**Scrub, scream**	/ʌ/ & /i:/	**Lax & Tense**

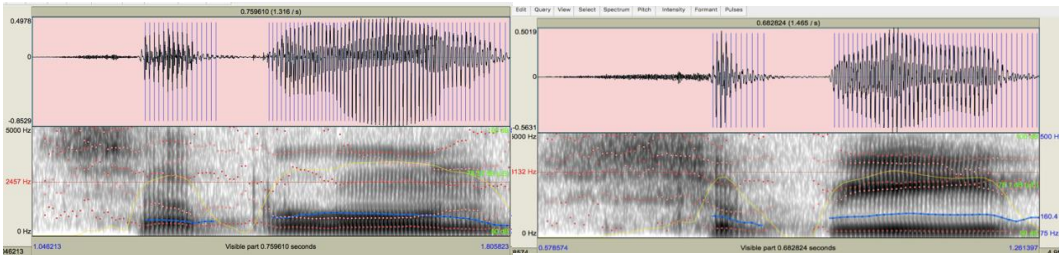
All the recordings were made in an informal way, and in order to reduce the observant paradox effects, a certain distance was maintained from the participants during the recordings. All participants were given time before the recordings and instructions on how to record. All the recordings were made using a field recorder. Each recording lasted approximately 15 minutes. Kashmiri speakers' spectrographic features of /s/ clusters at onset position were studied using Praat software.

Results and Discussion

In Pakistani English, Kashmiri speakers insert /ə/ in the /s/ clusters at onset position as discussed below:

Syllabification of /sp/ cluster at onset position

The spectrograph shows that in Pakistani English, Kashmiri speakers insert /ə / between /sp/ cluster at onset position when the cluster is followed by tense vowels as shown in figure 1 below:



/ s ə p u: n/ / s ə p i: k/

Fig 1: Epenthesis at onset position in /sp/ cluster in PE by Kashmiri speakers

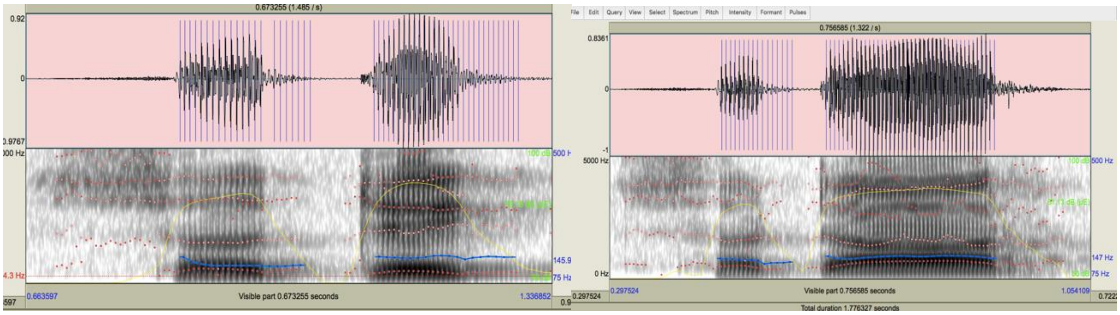
Table 2
Percentile of epenthesis between /sp/ cluster at onset

Total speakers	Insertion of / ə / in the word 'spoon'	Insertion of / ə / in the word 'speak'	Didn't Insert / ə / in the word 'spoon'	Didn't Insert / ə / in the word 'speak'
10	9	10	1	0
100	90%	100 %	10%	0%

The above table 2 shows that 90 % speakers inserted / ə/ between /sp/ cluster at the onset position in the words 'spoon' and 'speak'. The data shows that in both the context of the CCVC, V is a tense vowel. The data shows that only 1 speaker (10 %) speaker didn't insert the /ə/ between CC cluster at the onset position in the word 'spoon'. The data shows that there was 0% people who didn't insert /ə/ in the word 'speak'. The above table reflects that Kashmiri speakers prefer to break the onset cluster of /sp/ at onset position in English by inserting / ə/.

Syllabification of /st/ cluster at onset position

The spectrograph given in figure 2 indicates that in Pakistani English, Kashmiri speakers insert /ə / between /st/ cluster at onset position when the cluster is followed by tense and lax vowels as shown in figure 2 below:



/ s ə t ɪ k/ / s ə t a: r/

Fig 2: Epenthesis at onset position in /st/ cluster in PE by Kashmiri speakers

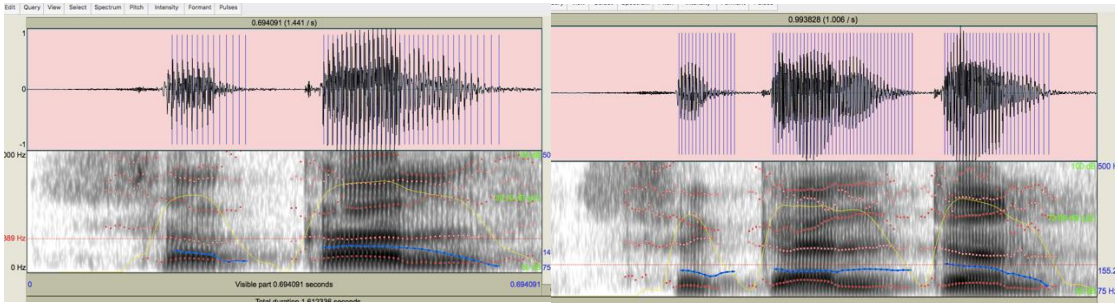
Table 3
Percentile of epenthesis between /st/ cluster at onset

Total speakers	Insertion of / ə / in the word 'stick'	Insertion of / ə / in the word 'star'	Didn't Insert / ə / in the word 'stick'	Didn't Insert / ə / in the word 'star'
10	6	8	4	2
100	60%	80 %	40%	20%

The above table 3 shows that 60 % speakers inserted / ə/ between /st/ cluster at the onset position in the word 'stick' and 80 % speakers in the word 'star'. The data shows that the word 'stick' /st/ cluster is followed by short high front vowel whereas in the word 'star' /st/ cluster is followed by low back long vowel /a/. in addition, data shows that 40 % participants didn't insert / ə/ in /st/ cluster when it is followed by short vowel and 20% speakers didn't insert / ə/ when /st/ cluster is followed by tense low back /a/.

Syllabification of /sk/ cluster at onset position

The spectrograph given in figure 3 indicates that in Pakistani English, Kashmiri speakers insert /ə / between /sk/ cluster at onset position when the cluster is followed by tense and lax vowels as shown in figure 3 below:



/ s ə k ʌ l/ / s ɪ k ɛ l t ə n/

Fig 3: Epenthesis at onset position in /sk/ cluster in PE by Kashmiri speakers

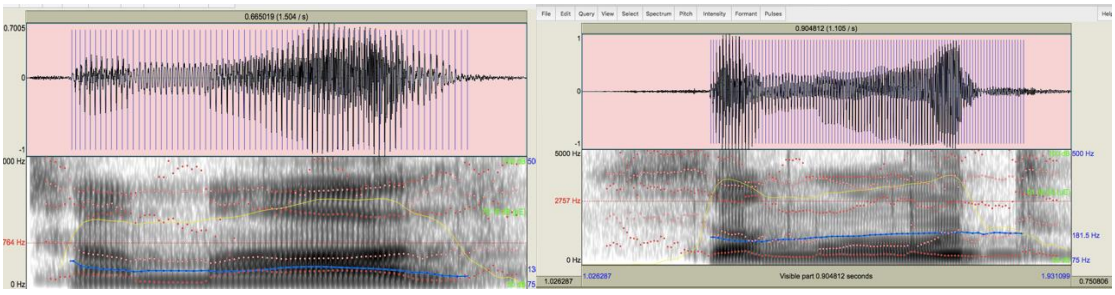
Table 4
Percentile of epenthesis between /sk/ cluster at onset

Total speakers	Insertion of / ə / in the word 'skull'	Insertion of / ɪ / in the word 'Skelton'	Didn't Insert / ə / in the word 'skull'	Didn't Insert /ɪ / in the word 'star'
10	8	6	2	4
100	80%	60 %	20%	40%

The above table 4 shows that 80 % speakers inserted / ə/ between /sk/ cluster at the onset position in the word 'skull' and 60 % speakers inserted short high vowel / ɪ / in the word 'Skelton'. The F1 of the short vowel / ɪ / is 454 and F2 of the short high vowel / ɪ / is 2158 Hz in the word 'Skelton' as shown in the spectrograph in figure 4. The data shows that in the word 'skull' /sk/ cluster is followed by short central vowel / ʌ/ whereas, in the word 'Skelton' /sk/ cluster is followed by front centralized vowel /ɛ/. in addition, data shows that 20 % participants didn't insert / ə/ in /sk/ cluster in the word 'skull', and 40% speakers didn't insert / ə/ or / / ɪ / in the word 'Skelton'.

Syllabification of /sm/ cluster at onset position

The spectrograph given in figure 4 indicates that in Pakistani English, Kashmiri speakers insert /ə / between /sm/ cluster at onset position when the cluster is followed by tense and lax vowels as shown in figure 4 below:



/ s ə m a: **l/** **/ s ə m** uː **ð /**

Fig 4: Epenthesis at onset position in /sm/ cluster in PE by Kashmiri speakers

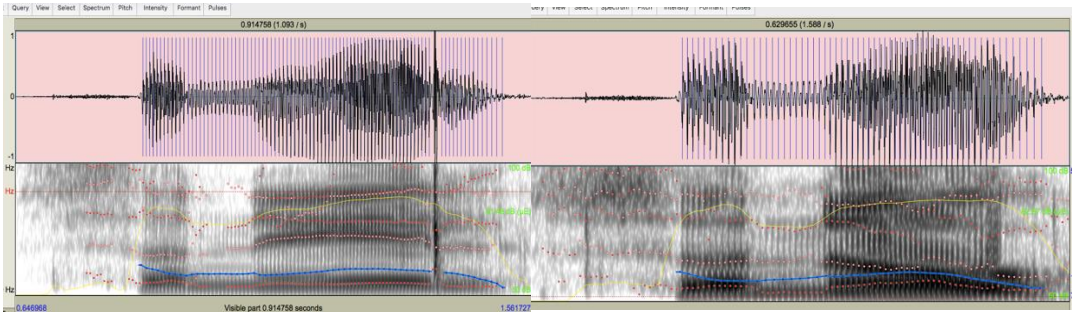
Table 5
Percentile of epenthesis between /sm/ cluster at onset

Total speakers	Insertion of / ə / in the word 'small'	Insertion of / ə / in the word 'Smooth'	Didn't Insert / ə / in the word 'small'	Didn't Insert / ə / in the word 'smooth'
10	9	8	1	2
100 %	90%	80 %	10%	20%

The above table 5 shows that 90 % speakers inserted / ə/ between /sm/ cluster at the onset position in the word 'small' and 80 % speakers in the word 'Smooth'. The data shows that in the word 'small' /sm/ cluster is followed by low back vowel /a:/ in Pakistani English. Whereas, in the word 'Smooth' /sm/ cluster is followed by back high long vowel /u:/. in addition, data shows that 10 % participants didn't insert / ə/ in /sm/ cluster in the word 'small', and 20% speakers didn't insert / ə/ in the word 'Smooth'.

Syllabification of /sn/ cluster at onset position

The spectrograph given in figure 5 indicates that in Pakistani English, Kashmiri speakers insert /ə / between /sn/ cluster at onset position when the cluster is followed by tense and lax vowels as shown in figure 5 below:



/ s ə n eɪ **l/** **/ s ə n** əʊ **/**

Fig 5: Epenthesis at onset position in /sn/ cluster in PE by Kashmiri speakers

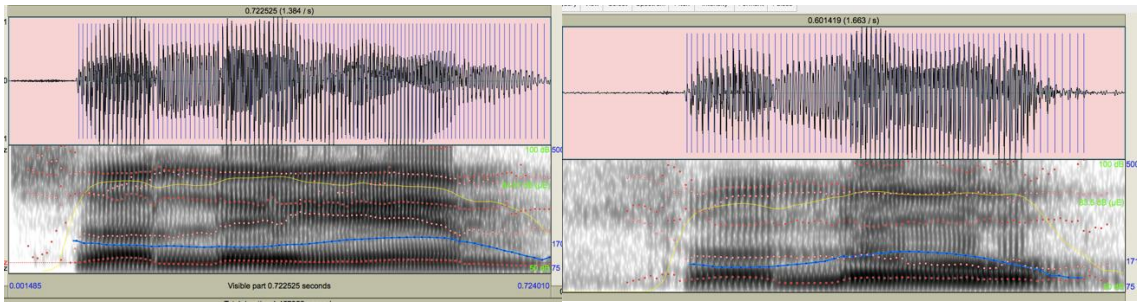
Table 6
Percentile of epenthesis between /sn/ cluster at onset

Total speakers	Insertion of / ə / in the word 'snail'	Insertion of / ə / in the word 'Snow'	Didn't Insert / ə / in the word 'snail'	Didn't Insert / ə / in the word 'snow'
10	10	9	0	1
100 %	100%	90 %	0%	10%

The above table 6 shows that 100 % speakers inserted / ə/ between /sn/ cluster at the onset position in the word 'snail' and 90 % speakers in the word 'Snow'. The data shows that in the word 'snail' /sn/ cluster is followed by diphthong / eɪ/ in Pakistani English. Whereas, in the word 'Snow' /sn/ cluster is followed by diphthong /əʊ/ but Kashmiri speakers mutate it into / /ʊ/ and delete /ə/. in addition, data shows that 10 % participants didn't insert / ə/ in /sn/ cluster in the word 'snow', and 0% speakers didn't insert / ə/ in the word 'Snail'.

Syllabification of /sl/ cluster at onset position

The spectrograph given in figure 6 indicates that in Pakistani English, Kashmiri speakers insert /ə / between /sl/ cluster at onset position when the cluster is followed by tense and lax vowels as shown in figure 6 below:



/ s ə l e m/ **/ s ə l ʊ /**

Fig 6: Epenthesis at onset position in /sl/ cluster in PE by Kashmiri speakers

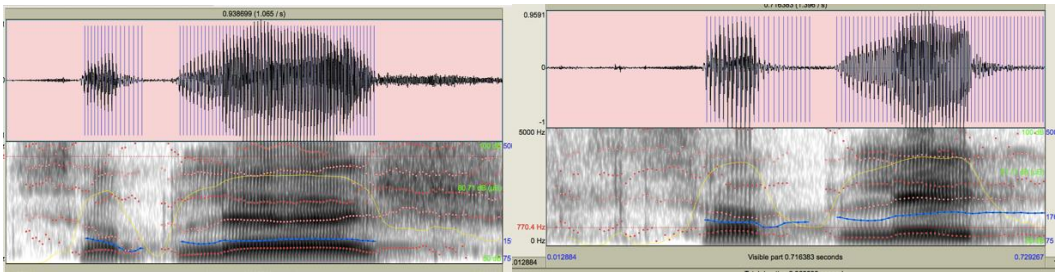
Table 7
Percentile of epenthesis between /sl/ cluster at onset

Total speakers	Insertion of / ə / in the word 'snail'	Insertion of / ə / in the word 'Snow'	Didn't Insert / ə / in the word 'snail'	Didn't Insert / ə / in the word 'snow'
10	10	7	0	3
100 %	100%	30 %	0%	30%

The above table 7 shows that 100 % speakers inserted / ə/ between /sl/ cluster at the onset position in the word 'slam' and 70 % speakers in the word 'Slow'. The data shows that in the word 'slam' /sl/ cluster is followed by low back tense vowel / a/ and Kashmiri speakers change it into /e/ in Pakistani English. Whereas, in the word 'Slow' /sl/ cluster is followed by diphthong /əʊ/ but Kashmiri speakers mutate it into /ʊ/ and delete /ə/. in addition, data shows that 30 % participants didn't insert / ə/ in /sl/ cluster in the word 'slow', and 0% speakers didn't insert / ə/ in the word 'Slam'.

Syllabification of /spl/ cluster at onset position

The spectrograph given in figure 7 indicates that in Pakistani English, Kashmiri speakers insert /ə / between /spl/ cluster at onset position when the cluster is followed by tense and lax vowels as shown in figure 7 below:



/ s ə p l a ʃ/ **/ s ə p** l. ɪ t /

Fig 7: Epenthesis at onset position in /spl/ cluster in PE by Kashmiri speakers

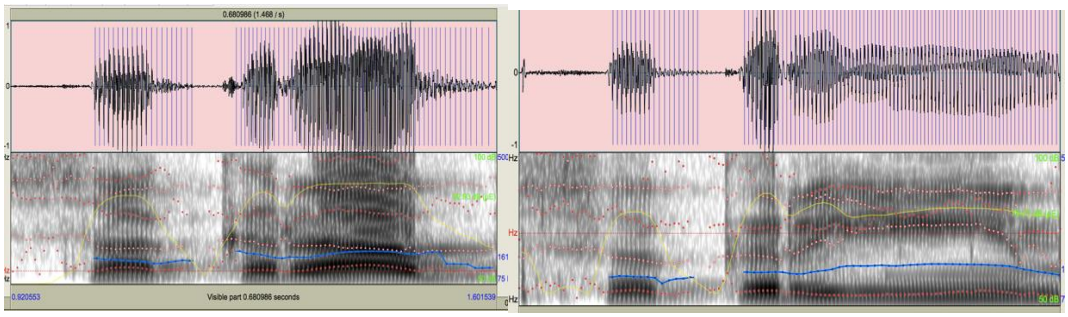
Table 8
Percentile of epenthesis between /spl/ cluster at onset

Total speakers	Insertion of / ə / in the word 'split'	Insertion of / ə / in the word 'Splash'	Didn't Insert / ə / in the word 'split'	Didn't Insert / ə / in the word 'splash'
10	9	10	1	0
100 %	90%	100 %	10%	0%

The above table 8 shows that 100 % speakers inserted / ə/ between /spl/ cluster at the onset position in the word 'split' and 90 % speakers in the word 'Splash'. The data shows that in the word 'split' /spl/ cluster is followed by a lax vowel / ɪ / and whereas, in the word 'Splash' /spl/ cluster is followed by a tense vowel /a:/. In addition, data shows that 10 % participants didn't insert / ə/ in /spl/ cluster in the word 'split', and 0% speakers didn't insert / ə/ in the word 'Splash'.

Syllabification of /skr/ cluster at onset position

The spectrograph given in figure 8 indicates that in Pakistani English, Kashmiri speakers insert /ə / between /skr/ cluster at onset position when the cluster is followed by tense and lax vowels as shown in figure 8 below:



/ s ə k r a b/ **/ s ə k** r i: m /

Fig 8: Epenthesis at onset position in /skr/ cluster in PE by Kashmiri speakers

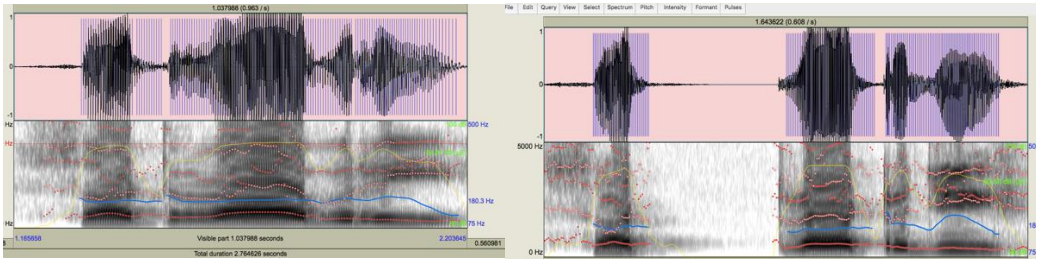
Table 9
Percentile of epenthesis between /skr/ cluster at onset

Total speakers	Insertion of / ə / in the word 'scream'	Insertion of / ə / in the word 'Scrub'	Didn't Insert / ə / in the word 'scream'	Didn't Insert / ə / in the word 'scrub'
10	10	10	0	0
100 %	100%	100 %	0%	0%

The above table 9 shows that 100 % speakers inserted / ə/ between /skr/ cluster at the onset position in the word 'scream' and 100 % speakers in the word 'Scrub'. The data shows that in the word 'scream' /skr/ cluster is followed by a tense vowel / i: / whereas, in the word 'Scrub' /skr/ cluster is followed by a lax vowel / ʌ/. In addition, data shows that 0 % participants didn't insert / ə/ in /skr/ cluster in the word 'skr', and 0% speakers didn't insert / ə/ in the word 'Scream'.

Syllabification of /str/ cluster at onset position

The spectrograph given in figure 9 indicates that in Pakistani English, Kashmiri speakers insert /ə / between /str/ cluster at onset position when the cluster is followed by tense and lax vowels as shown in figure 9 below:



/ s ə t r a **b** ə r i/ **/ s ə t t** r ə t.ɪ dʒ i/

Fig 9: Epenthesis at onset position in /str/ cluster in PE by Kashmiri speakers

Table 10
Percentile of epenthesis between /str/ cluster at onset

Total speakers	Insertion of / ə / in the word 'strategy'	Insertion of / ə / in the word 'Strawberry'	Didn't Insert / ə / in the word 'strategy'	Didn't Insert / ə / in the word 'strawberry '
10	9	70	1	3
100 %	90%	70 %	10%	30%

The above table 10 shows that 90 % speakers inserted / ə/ between /str/ cluster at the onset position in the word 'strategy' and 70 % speakers in the word 'Strawberry'. The data shows that in the word 'strategy' /str/ cluster is followed by a lax vowel / a/ whereas, in the word 'Strawberry' /str/ cluster is followed by a tense vowel / ɔ:/. In addition, data shows that 3 % participants didn't insert / ə/ in /str/ cluster in the word 'strawberry', and 1% speakers didn't insert / ə/ in the word 'Strategy. However, data shows that speakers muted the / ɔ:/ into /a:/ in the word 'strawberry'. Data also shows that Kashmiri speakers ambisyllabify /t/ in the word 'strategy' at the word medial syllable boundary.

Summary of the Cluster break at onset position in Pakistani English by Kashmiri Speakers

Table 11
Vowel / ə/ insertion in CC and CCC cluster at onset position

	Vowel / ə/ insertion in CC and CCC cluster
/sp/	**Vowel /** ə/ insertion in CC by Kashmiri speakers in PE
/st/	**Vowel /** ə/ insertion in CC by Kashmiri speakers in PE
/sk/	**Vowel /** ə/ insertion in CC by Kashmiri speakers in PE
/sl/	**Vowel /** ə/ insertion in CC by Kashmiri speakers in PE
/sm/	**Vowel /** ə/ insertion in CC by Kashmiri speakers in PE
/sn/	**Vowel /** ə/ insertion in CC by Kashmiri speakers in PE
/spr/	**Vowel /** ə/ insertion in CCC by Kashmiri speakers in PE
/str/	**Vowel /** ə/ insertion in CCC by Kashmiri speakers in PE
/skr/	**Vowel /** ə/ insertion in CCC by Kashmiri speakers in PE

The above table 11 shows the summary of /s/ clusters at onset position in Pakistani English, where Kashmiri speakers insert / ə/ and break the cluster. The clusters occurred in the following phonetic environments in Pakistani English:

Table 12
CC & CCC clusters at onset followed by the vowel

	CC cluster followed by the **Vowel**	**Environment**
/sp/	**/i:/ & /u:/**	**Tense & Tense**
/st/	/ɪ/ & /a:/	**Lax & Tense**
/sk/	**/** ʌ**/ &** /ɛ/	**Lax & Lax**
/sl/	/a:/ & /au/	**Tense & Tense**
/sm/	/ɔ:/ & /u:/	**Tense & Tense**
/sn/	/eɪ/ & /əʊ/	**Tense & Tense**
/spl/	/ɪ/ & /a:/	**Lax & Tense**
/str/	**/a:/ &** /ɔ: /	**Tense & Tense**
/skr/	/ʌ/ & /i:/	**Lax & Tense**

The above table 12 shows that Kashmiri speakers of Pakistani English break the CC and CCC clusters at onset position when the clusters are followed by both the tense and lax vowels. The speakers insert /ə/ between CC and CCC clusters at onset position.

Conclusion

The findings of the study indicate that Kashmiri speakers of Pakistani English articulate the /s/ clusters in onset position with epenthesis. The data shows that Kashmiri speakers of Pakistani English break the CC and CCC clusters by inserting /ə/ & /ɪ/ at the onset position. Data shows that Kashmiri speakers of Pakistani English break the clusters of English in both phonetic environments when the CC cluster is followed by a lax vowel and when it is followed by a tense vowel. The data show that epenthesis is evidence of L1 influence on Kashmiri speakers' articulation of CC and CCC clusters of English. The statistics show that epenthesis is very frequent in sC-clusters at the onset position of di- and tri-syllabic words. The results of the study show that the native-like accuracy ratio is very low, and speakers break the input cluster ordering in Pakistani English. Furthermore, the study's findings show that speakers in Pakistani English violate the sonority sequencing principle in sC-ordering at the onset position of the syllables. The data analysis shows that Kashmiri speakers of Pakistani English are more sensitive to sC-clusters at onset position, and the syllabification of CC and CCC clusters at onset position is conditioned by epenthetic constraints. In addition, the difficulty in acquiring sC-clusters indicates that in Kashmiri, sC-

clustering is conditioned to vowel insertion, and because of L1 phonological constraints, speakers also break the CC and CCC clusters in Pakistani English. Moreover, extra-linguistic features like gender, education, and age do not affect the syllabification of sC-clustering at the onset position of the syllable in Kashmiri English. The study recommends in-depth analysis of the interlanguage syllabification of Kashmiri and English sC-clustering at coda position by increasing the sample size and including extra-linguistic variables.

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