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ONSET SYLLABLE CLUSTERING IN PAKISTANI ENGLISH: OPTIMALITY ANALYSIS

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Key Words: Onset Clusters, Vowel Epenthesis, Optimality Theory, Spectrographic Features.

ABSTRACT:
In Pakistan, English is widely used as language of education and office correspondence. Pakistani English emerged as distinct non-native variety with its own morphological and phonological features. The current study aims to describe the onset clustering within the optimality theory framework. The study applies optimality theory and praat analysis for description of the phenomenon. The study reveals that Pakistani speakers use epenthesis to overcome the problems of sonority sequencing. The spectrographic features confirm the short vowel insertion between 'CC' clusters at the onset position.

INTRODUCTION

Onset clusters in English refer to a sequence of consonant sounds that occur at the beginning (onset) of a syllable. English allows various types of onset clusters, and their presence or absence can differ depending on dialects and individual speech patterns like single consonant onset: This occurs when only one consonant sound appears at the beginning of a syllable, such as in words like "pen," "cat," or "sit.", Consonant + liquid onset: This cluster consists of a consonant sound followed by a liquid sound (/l/ or /r/), like "play," "try," or "clean.", consonant + glide onset: In this case, a consonant sound is followed by a glide sound (/w/ or /j/), words like "twice," "quick," or "queen.", stop + fricative onset: This cluster involves a stop consonant sound followed by a fricative sound, words like "stop," "drink," or "press.", S + stop onset: This cluster features the /s/ sound followed by a stop consonant, words like "stand," "skip," or "smile.", Consonant + nasal onset: This cluster consists of a consonant sound followed by a nasal sound (/m/, /n/, or /ŋ/), words like "blue," "green," or "string." The current study aims to describe the onset syllable clustering in

Pakistani English in the optimality theory framework. The main objective of the study is to describe the way in which Pakistani English speakers use onset syllable clustering in their speech.

LITERATURE REVIEW

English has official status in Pakistan and is widely used in government, education, media, and business sectors. Ayaz and Kamran (2010) state that Pakistani English refers to the variety of English spoken in Pakistan, which has developed its own unique features influenced by the local languages and accents. Rehman (2010) states that Pakistani English exhibits certain distinctive pronunciation patterns. For example, there may be variations in the realization of certain consonant sounds, such as the dental fricatives /θ/ and /ð/, which are often pronounced as interdental stops [t̪] and [d̪], respectively. Additionally, the retroflex sounds /ɻ/ and /ɳ/ may be used in place of the alveolar sounds /r/ and /n/. Moreover, Mahboob (2004) describes that Pakistani English may exhibit differences in vowel sounds compared to other varieties of English. For instance, the vowel /æ/ in words like "cat" may be realized as a more open vowel [a]. Mahboob (2004) explains that there can also be variations in the pronunciation of diphthongs and the length of vowel sounds. Kamran (2017) states that the intonation patterns and stress placement in Pakistani English may differ from other varieties of English. Moreover, she states that Pakistani English tends to have a syllable-timed rhythm rather than the stress-timed rhythm found in some other varieties of English. Mir and Ayaz (2022) state that Pakistani English incorporates loanwords from various languages spoken in Pakistan, such as Urdu, Punjabi, Sindhi, and others. Moreover, they describe that these loanwords contribute to the unique vocabulary of Pakistani English. Mir and Ayaz (2022) state that Pakistani English displays certain syntactic patterns influenced by the native languages spoken in Pakistan. For example, there may be variations in word order or the use of certain constructions. Furthermore, Pakistani English has its own set of idiomatic expressions and colloquialisms that are distinct from other varieties of English and these expressions reflect the cultural and linguistic influences specific to Pakistan.

Goldsmith (1995) states syllable refers to phonological segment that has onset and rhyme. The rhyme is further divided into nucleus and coda. In English language, syllable contains consonant or consonant clusters at the onset and coda positions. Clements (1990) states that consonant clustering is done through the sonority sequencing principle (SSP) as sonority principle reveals the sonority of the consonants. Roach (2009) describes the consonant clusters in English using the sonority sequencing principle.

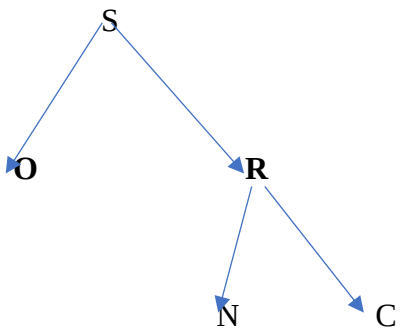


Fig 1: The syllable template

Gouskova (2001) states that speakers use repair strategies like epenthesis to pronounce the problematic consonant clusters at the onset or coda positions. In the consonant clustering sonority plays vital role in defining the grammaticality of the consonant clusters. Ladefoged (1993) states that sonority shows the perceptual values of consonant sounds.

METHODOLOGY

In the current research paper the focus is on the splitting of consonant clusters at the onset position in multi-syllabic words in Pakistani English. The phenomenon is explained in the theoretical framework of optimality theory (OT). Prince and Smolensky (1993), and McCarthy (2008) proposed the optimality theory and constraints to explain the such phonological phenomena like consonant splitting in a syllable. Roach (2009) describes the following onset clusters in English:

a. Stop-liquid clusters
b. Stop-sonorant clusters
c. Fricative-nasal clusters
d. Fricative -liquid clusters
e. Fricative-sonorant clusters
f. Fricative- plosive clusters
g. Fricative-fricative clusters
h. Liquid-sonorant cluster

The current study uses the data of onset clusters **(stop+ liquid, Fricative+ Nasal, Fricative+ approximant, and fricative +stop**) in the multi-syllabic English words for the description of the phenomena under investigation. A total of 16 words with stop-liquid and fricative-stop clusters are included in the study. The words are selected based on variability in the consonant clusters, lexical category, diverse phonological environment of consonant clusters. The words were presented to 5 participants of Pakistani English speakers having diversity in first language. The data was recorded and transcribed to describe the onset clustering.

DATA ANALYSIS

Table 1: Onset Clusters with P+L

Onset Clusters	Examples	Transcription	BE
/gr/	Grape	/greɪp/$_{N}$	**CCVVC**
/tr/	Tragedy	/ˈtrædʒ.ə.di/$_{N}$	**CCVC.V.CV**
/br/	Bright	/braɪt/$_{Adj}$	**CCVVC**
/kr/	Crime	/kraɪm/$_{N}$	**CCVVC**
/gl/	Glimpse	/glɪmps/$_{V}$	**CCVCCC**
/kl/	Claim	/kleɪm/$_{V}$	**CCVVC**
/bl/	Blatant	/ˈbleɪ.tənt/$_{Adj}$	**CCVV.CVCC**
/pr/	Praying	/preɪ/$_{V}$	**CCVV**
/pl/	Player	/ˈpleɪ.ər/$_{N}$	**CCVV.VC**
/dr/	Driver	/ˈdraɪ.vər/$_{N}$	**CCVV.CVC**
/sp/	Speak	/spiːk/$_{V}$	**CCVC**
/sn/	Snake	/sneɪk/$_{N}$	**CCVVC**
/sl/	Sleeper	/ˈsliː.pər/$_{N}$	**CCV.CVC**

/st/	Station	/ˈsteɪ.ʃən/$_N$	**CCVV.CVC**
/str/	Struggle	/ stræg.əl/$_V$	**CCCVCVC**

Prince & Smolensky (1993/2004), and McCarthy (2008) describe the markedness constraint of Onset for the syllable which signifies that syllables must have onsets. Moreover, Prince & Smolensky (1993/2004), and McCarthy (2008) explain the *Comp-Ons constraint that refers to the fact that complex onset cannot occur tautosyllabically in a cluster at onset position. The above mentioned constraints need to be ranked higher than faithfulness constraints for showing inviolability. McCarthy & Prince (1995) describe two faithfulness constraints to describe deletion and epenthesis processes in a syllable. These constraints are MAX-IO: Input should have same correspondence with the output, DEP-IO: McCarthy (2008) states that output should be similar to the input. McCarthy (2008) discusses the NO-Coda constraint. It refers that syllables have optional codas.

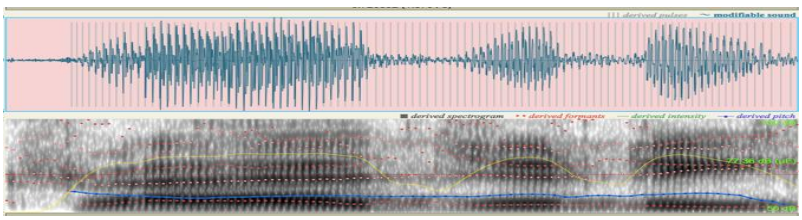
The data shows that Pakistani English speakers, re-syllabify the input structures of multi-syllabic words and the constraint ranking will be
ONSET>>*Comp-Ons>>MAX-IO>>DEP-IO>>No-Coda

Tableau 1: Analysis of re-syllabification in PE

/ˈtrædʒ.ə.di/	Ons	*C-Ons	Max-IO	No-Coda	Dep-IO
/ˈtræ.dʒəd.i/				*!	
⟶ /ˈtræ.dʒə.di/					*!
/ˈtræ.edʒ.ə.di/	*!			*	*
/ˈtræ. dʒr.ə.di/		*!		*	**!
/ˈtræ. dʒ.di/			*!		

The above tableau signifies that Onset and *Comp-Ons are the higher ranked constraints in Pakistani English and inviolable. The tableau shows that the candidates (b) is optimal because it does not violate the higher ranked constraints at the cost of lower ranked constraints.

Kager (1999) states that the sonority sequence of the sounds is
Stops<<Fricatives<nasals<liquids<Vowels



/ˈtr	æ.	dʒ	ə.	d	i/

Fig.2: Spectrograph of the word ‘tragedy’

McCarthy (2008) describes the constraint of Contiguity for dealing with the phenomenon of word internal insertion. Furthermore, McCarthy (2008) introduces the constraint of DEP-V for the output vowel segment which is not part of the input. In addition, McCarthy (2008) describes DEP-C constraint for describing the consonant segment that was not part of input but inserted in the output.

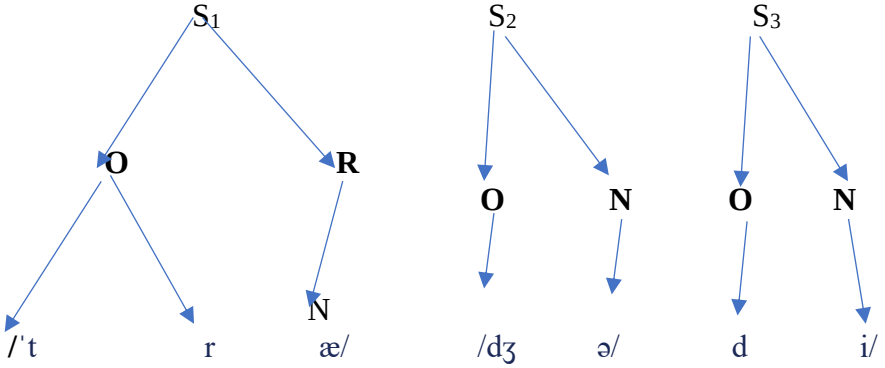


Fig 3: The syllable template of the word 'Tragedy' in PE

Tableau 2: Analysis of the word / ˈstræt.ə.dʒi/

/ˈstræt.ə.dʒi/	Ons	*C-Ons	M-IO	Dep-V	Syll-Cont	Contiguity	Dep-C
⟹ /ʔˈes.træ.tə.dʒi/				*		*	*
/ˈse.træ.tə.dʒi/				*		**!	*
/ˈes.træ.tə.dʒi/	*!			*		*	*
/ˈstræ.tə.dʒi/		*!					
/ˈtræ.tə.dʒi/			*!				

The above tableau shows that DEP-V, Contiguity and DEC-C are ranked lower than Max-IO, *Comp-Ons and Onset constraints. The tableau signifies that the candidate (a) is optimal candidate because it does not violate the higher ranked constraints Max-IO, *Comp-Ons and Onset and violate the lower ranked constraints DEP-V, Contiguity and DEC-C. The candidates b, c, d, e are not optimal because these candidates violate the higher ranked constraints.

Tableau 3: onset clustering in the word /ˈsteɪ.ʃən/$_N$

/ˈsteɪ.ʃən/	Ons	*C-Ons	M-IO	Dep-V	Syll-Cont	Contiguity	Dep-C
⟹ /ˈsə.teɪ.ʃən/				*		*	
/ˈes.teɪ.ʃən/	*!			*	*		
/ˈʔes.teɪ.ʃən/				*	*!		
/ˈsteɪ.ʃən/		*!					
/ˈteɪ.ʃən/			*!				

In the above tableau the optimal candidate is /ˈsə.teɪ.ʃən/ because Pakistani English speakers insert short centralized vowel /ə/ between /s/ and /t/ at the onset position. The above tableau shows that DEP-V, Contiguity and DEC-C are ranked lower than Max-IO, *Comp-Ons and Onset constraints. The tableau

signifies that the candidate (a) is optimal candidate because it does not violate the higher ranked constraints Max-IO, *Comp-Ons and Onset and violate the lower ranked constraints DEP-V, Contiguity and DEC-C. The candidates b, c, d, e are not optimal because these candidates violate the higher ranked constraints. The data shows that Pakistani English speakers use epenthesis as repair strategy to overcome the challenge of sonority sequencing violation at the onset position in the clustering of /st/.

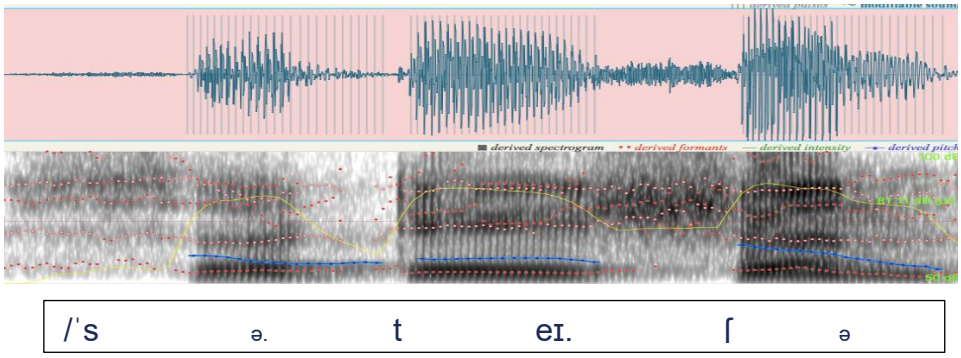


Fig 4. Epenthesis at onset between /s/ and /t/ in PE

Tableau 4: Onset clustering in the word /ˈstræg.əl/$_N$

/ ˈ strægəl/	Ons	*C-Ons	M-IO	Dep-V	Syll-Cont	Contiguity	Dep-C
⟹ /ˈ sət.ræg.əl/				*	*		
/ ˈ stræ.gə.əl /				*!		*	
/ ˈ stræ. əg.əl/	*!			*	*		
/ ˈ stræg.əl/		*!		*!	*		
/ ˈ stæg.əl/			*!				

In the above tableau the optimal candidate is /ˈstræg.əl / because Pakistani English speakers insert short centralized vowel /ə/ between /s/ and /t/ at the onset position. The above tableau shows that DEP-V, Contiguity and DEC-C are ranked lower than Max-IO, *Comp-Ons and Onset constraints. The tableau signifies that the candidate (a) is optimal candidate because it does not violate the higher ranked constraints Max-IO, *Comp-Ons and Onset and violate the lower ranked constraints DEP-V, Contiguity and DEC-C. The candidates b, c, d, e are not optimal because these candidates violate the higher ranked constraints. The data shows that Pakistani English speakers use epenthesis as repair strategy to overcome the challenge of sonority sequencing violation at the onset position in the clustering of /st/.

Tableau 5: Vowel epenthesis between onset clustering in the word /spraɪt/$_V$

/ˈspraɪt/	Ons	*C-Ons	M-IO	Dep-V	Syll-Cont	Contiguity	Dep-C
⟹ /ˈsəp.raɪt/				*		*	
/ˈsəp.ʔraɪt/		*!		*!		*	
/ˈʔəs.praɪt/		*!		*	*!		*

/ˈspə.raɪt/		*!		*!	*	*	
/ˈsə.praɪt/		*!					
/ˈsə.raɪt/			*!				

In the above tableau the optimal candidate is /ˈsəpraɪt / because Pakistani English speakers insert short centralized vowel /ə/ between /s/ and /p/ at the onset position. The above tableau shows that DEP-V, Contiguity and DEC-C are ranked lower than Max-IO, *Comp-Ons and Onset constraints. The tableau signifies that the candidate (a) is optimal candidate because it does not violate the higher ranked constraints Max-IO, *Comp-Ons and Onset and violate the lower ranked constraints DEP-V, Contiguity and DEC-C. The candidates b, c, d, e are not optimal because these candidates violate the higher ranked constraints. The data shows that Pakistani English speakers use epenthesis as repair strategy to overcome the challenge of sonority sequencing violation at the onset position in the clustering of /sp/. The consonant /s/ has more sonority value than the voiceless stop /p/ , and according to the sonority sequencing principle /s/ should come after /p/, but in English /s/-clusters at the onset and coda positions violate the sonority sequencing principle. Data illustrates that Pakistani English speakers use epenthesis strategy to overcome the sonority sequencing constraint at the onset position between the fricative /s/ and voiceless stop /p/.

The ranking of the constraint will be :

Onset>>Comp.Ons>>Max-IO>>Dep-V>>Syll.Cont>>Contiguity>>DEP-C>>No-Coda

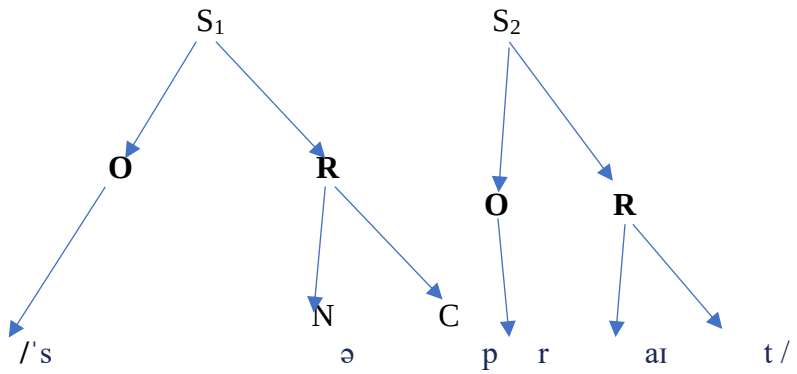


Fig 5: The syllable template of the word 'Tragedy' in PE

The figure 5 shows that a new syllable is formed by insertion of short vowel /ə/ between the consonant cluster /spr/ at the word initial onset position. The vowel is inserted between C_1 and C2 . Data shows that speakers prefer coda by moving /p/ at the coda position of S_1 than the onset of the following syllable S_2.

Tableau 5: Vowel epenthesis between onset clustering in the word /sneɪk/$_N$

/ˈsneɪk/	Ons	*C-Ons	M-IO	Dep-V	Syll-Cont	Contiguity	Dep-C
⟹ /ˈsə.neɪk/				*		*	
/ˈʔəs.neɪk/					*	*	*

/ˈəs.neɪk/	*!			*	*		*
/ˈse.neɪk/	*!				*		
/ˈsneɪk/		*!					
/ˈneɪk/			*!				

In the above tableau the optimal candidate is /ˈsneɪk/ because Pakistani English speakers insert short centralized vowel /ə/ between /s/ and /n/ at the onset position. The above tableau shows that DEP-V, Contiguity and DEC-C are ranked lower than Max-IO, *Comp-Ons and Onset constraints. The tableau signifies that the candidate (a) is optimal candidate because it does not violate the higher ranked constraints Max-IO, *Comp-Ons and Onset and violate the lower ranked constraints DEP-V, Contiguity and DEC-C. The candidates (b, c, d, e ,f), are not optimal because these candidates violate the higher ranked constraints. The data shows that Pakistani English speakers use epenthesis as repair strategy to overcome the challenge of sonority sequencing violation at the onset position in the clustering of /sn/. The consonant /s/ has less sonority value than the nasal /n/, but still in Pakistani English, speakers use epenthesis strategy to pronounce the /sn/ cluster splitted because of L1 influence. The ranking of the constraint will be :

Onset>>Comp.Ons>>Max-IO>>Dep-V>>Syll.Cont>>Contiguity>>DEP-C>>No-Coda

Tableau 5: Vowel epenthesis between onset clustering in the word /sl/

/ˈsliː.pər/	Ons	*C-Ons	M-IO	Dep-V	Syll-Cont	Contiguity	Dep-C
☞ /ˈsə.liː.pər/				*		*	
/ʔˈəs.liː.pər/				*	*	*	*
/ˈsliː.pər/	*!			*	*		*
/ˈsliː.pər/		*!			*		
/ˈsliː.pər/		*!					
/ˈsiː.pər/			*!				

In the above tableau the optimal candidate is /ˈsə.liː.pər/ because Pakistani English speakers insert short centralized vowel /ə/ between /s/ and /l/ at the onset position. The above tableau shows that DEP-V, Contiguity and DEC-C are ranked lower than Max-IO, *Comp-Ons and Onset constraints. The tableau signifies that the candidate (a) is optimal candidate because it does not violate the higher ranked constraints Max-IO, *Comp-Ons and Onset and violate the lower ranked constraints DEP-V, Contiguity and DEC-C. The candidates (b, c, d, e ,f), are not optimal because these candidates violate the higher ranked constraints. The data shows that Pakistani English speakers use epenthesis as repair strategy to overcome the challenge of sonority sequencing violation at the onset position in the clustering of /sl/. The consonant /s/ has less sonority value than the nasal /l/, but still in Pakistani English, speakers use epenthesis strategy to pronounce the /sl/ cluster splitter because of L1 influence. The ranking of the constraint will be :

Onset>>Comp.Ons>>Max-IO>>Dep-V>>Syll.Cont>>Contiguity>>DEP-C>>No-Coda

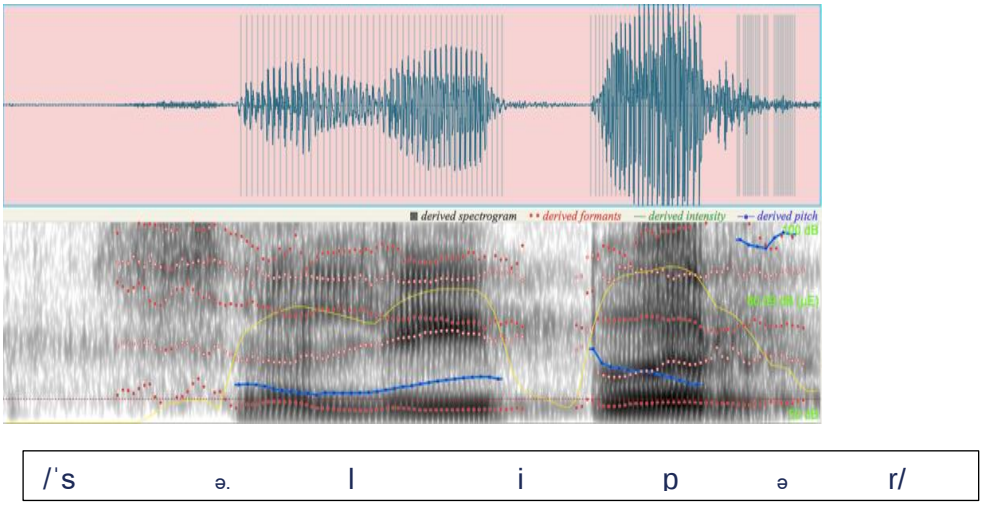


Fig 6: Spectrograph of epenthesis between /s/ and /l/ cluster at onset in PE

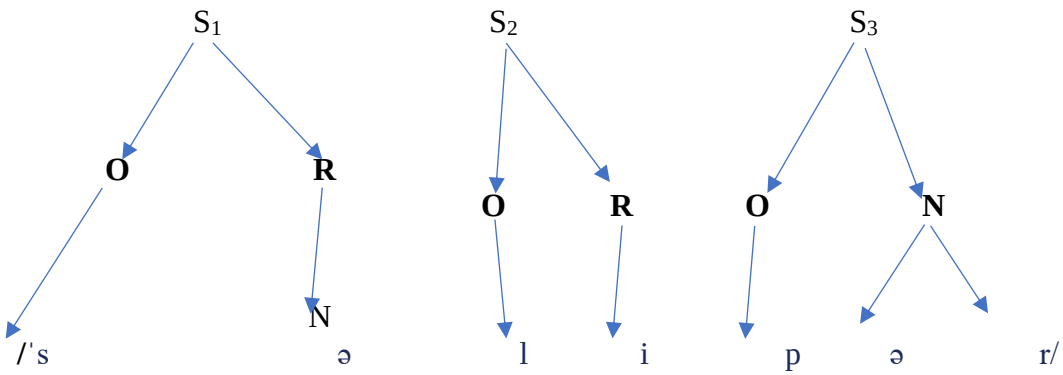


Fig 7: The syllable template of the word 'Sleeper' in PE

The figure 7 shows that a new syllable is formed by insertion of short vowel /ə/ between the consonant cluster /sl/ at the word initial onset position. The vowel is inserted between C_1 and C2 . Data shows that speakers prefer Onset by moving /l/ at the onset position of S_2 than the coda of the preceding syllable S_1.

CONCLUSION

In the current research, the onset clusters of stop fricative, fricative stop, fricative nasal, fricative approximant in CC and CCC clusters are described in Pakistani English, within the Optimality theory. The data reveals that in Pakistani English, speakers use epenthesis as repair strategy to counter the violation of sonority sequencing principle at the word initial onset position. The study concludes that in Pakistani English, overall ranking of the constraints will be Onset>>Comp.Ons>>Max-IO>>Dep-V>>Syll.Cont>>Contiguity>>DEP-C>>No-Coda. The study shows that Pakistani English speakers insert short vowel /ə/ at the onset position to counter the sonority sequencing violations in the CC clusters of /sp/, /st/ and in the 'CCC' clusters of /str/. However, data reveals that in the clusters of /sn/ and /sl/ Pakistani English speakers insert vowel /ə/, in which the sonority sequencing principle is followed because /s/ has less sonority than /n/ and /l/, unlike /sp/ where sonority sequence principle is

violated. The spectrographic features shows that Pakistani English speakers insert the short vowel /ə/ between the consonant clusters at the onset position in monosyllable, di-syllabic and tri-syllabic words in diverse phonetic environment.

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