Optimality Theory Analysis of Syllable Structures of Pakistani English

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Abstract

English, as a non-native variety, in Pakistan has acquired its own form most pronounced on the phonological level. The few attempts have been made to study its structures and treated phonology as marginalized part of lexical or syntactic descriptions. And even when phonological descriptions are carried out, the focus was segmental features only. Consequently, the present study aims to explore supra-segmental features exclusively; which make significant differences in pronunciation and cause problem of unintelligibility. Among many sub-varieties of Pakistani English PE, syllable structures and syllabification of variety of English news media of PE are described. Finally, for the sake of precision and accuracy, optimality theory (OT), proposed by Prince & Smolensky (1993), is selected as a model to analyze syllable structures of PE. For this purpose, the constraints on these phonological features were ranked to make a grammar by forming violation Tableaus to understand interaction of these constraints. The violation computing method VCM (Nadeem, 2016) is applied by ranking constraints of syllable structures in PE. It is concluded that PE forms different syllable structures and syllabification patterns. For example, syllabic consonant C॥ is not found in PE. Furthermore, Maximum Onset Principle MOP is not applicable word internally in PE. Syllable constraints hierarchy of PE is:

Peak, Faith V, Faith C, Son-seq (undominated) »
CCCσ » σCCC » Onset » No-coda » SLH

*Results show that PE does not allow cluster of three consonants word internally, so to capture this process CCCσ , σCCC constraints are added in the grammar of PE; because '*Complex' constraint prohibits occurrence of cluster of only two consonants.*

Keywords: Pakistani English, syllable structures, syllabification, optimality theory, Maximum Onset Principle

1. Introduction

English is spoken in many countries as a native, official, second and a foreign language. Generally, English language is classified into two main varieties: native English varieties and non-native English varieties. As a native variety, it is further divided into different sub-varieties spoken by different sociological groups, geographical areas and professionals. Like many other South-Asian countries, English language is also used in Pakistan as a non-native English variety. Within Pakistan, English is not spoken as a single variety, but is spoken with variations on the basis of the following differences: difference of schooling, exposure to the English language, demand of workplace, English language training opportunities etc. Most of these differences depend on the social class of Pakistani English speakers. People from high or high-middle social class get educated from such schools where their exposure to English language is more. They get jobs in

multi-national companies and they often visit or study English countries; so, the way they speak English is different from the way people of lower-middle class and lower classes speak. Within those varieties of Pakistani English, there are differences at different linguistic levels.

Other than socio-economical classes, non-native variety of English language spoken in Pakistan can also be classified into different sub-varieties based on multiple factors. One factor is first language (L1) background differences. For example, English varieties spoken by native Urdu, Pashtu, Sindhi, Balouchi, Saraiki speakers. Another factor is professional or academic differences, i.e. the variety spoken by English language teachers, English news media and university students.

Traditionally, for language acquisition, and language teaching only native varieties of English language were taken as the appropriate models for language description. However, over the last twenty years, as linguists explore and document the English language variations around the world, a growing acceptance of other varieties and of world Englishes has taken place. According to Mullany & Stockwell (2010), 'world Englishes' is a growing field of sociolinguistic study since 1980s.

Different varieties of English can vary at the level of Phonetics and Phonology, Morphology, Syntax, and Semantics. In spoken English the most noticeable variations are Phonological. Barber (1993) explains three main ways, in which phonological system of English varieties can differ. First, the inventory of phonemes; secondly, the pronunciation differences of the allophones; and thirdly, the distribution of phonemes, which includes the differences of prosodic features such as stress and intonation.

In this case, there is a need of such descriptive study about PE variety so that English language teachers in Pakistan can also focus on pronunciation problems of English learners by knowing how this variety is different in its syllable structure. Moreover, this study constitutes a commendable academic endeavor in its own right and is of interest to linguists who would like to understand how PE works as a system and what syllable structure and syllabification pattern it exhibits.

Studies have been conducted on the non-native varieties of English which includes: Bansal (1990) who studied the vowel system of Indian English, Kachru (1959, 1965, 1966, 1969 & 1975) who described Indian English at different linguistic levels and Rahman (2010) who explored all linguistic features of four socio-lects of PE. In Phonological and Phonetic features, he was concerned with the segmental features, but non-segmental features were described briefly. Mahboob and Ahmer (2004) also explain Pakistani English phonology but they describe it at segmental level only. Afsar and Kamran (2011) compared the consonantal phoneme of PSE with British Standard English (BSE) where they highlighted the inventorial, realizational, incidental and distributional differences in the consonantal phonemes of these two varieties. So, the description of the syllable structure and syllabification pattern of PE seems to be unexplored. This study serves to bridge this gap.

The study may be an important contribution to the field of research with some theoretical and practical benefits. Theoretically, it can provide the knowledge about the syllable structure of PE, which will lead to better understanding of the variety. Different researchers have described

phonological and phonetic features and its sub-varieties at segmental level by using different models and methods by comparing them with some other variety of English. The present research is significant as it is the first comprehensive study on syllable structure and syllabification pattern. Practically, the present study describes these structures of PE and can help to determine the pronunciation problems caused by variations in the syllable and syllabification pattern. In language classrooms, students struggle with pronunciation to promote proficiency and listening comprehension. There has not been enough research to explore the pronunciation problems of Pakistani English learners. There have been several researches regarding problems faced by language learners, who learn English as a second or foreign language in general but none of them focuses on Pakistani English speakers which leaves the Pakistani English pronunciation problems unaddressed.

2. Research Methodology

This study explores the news media as a sub-variety of Pakistani English Variety. The data is taken from the newscasters of English news of PTV and Radio Pakistan.These people of TV and Radio media are selected because they are specially trained for good pronunciation, are heard all over the world as Pakistani speakers of English, and they are people who are fluent in speaking English because of their education and exposure to English language; because of these reasons, they have less effect of their mother tongue on the stress pattern of English; so fewer variations as compared to other most localized varieties with sociolinguistics perspective. The English news recordings of total eleven news casters, four male and seven female, are taken as a sample. These are the official news casters who read news in the year 2012 out of them six are from PTV and seven from Radio Pakistan.

For data, monosyllabic words are not analysed to investigate syllabification patterns, so only those words are relevant in this study which are poly-syllabic, that is words containing more than one syllable. However, in terms of morphological structure of the words, there are both types present mono-morphemic, that is word with single free morpheme such as ‘complex’; as well as morphologically complex words, which are words with more than one morpheme such as ‘complex-ity’. After listening to news recordings, almost 100 words (10% monosyllabic and 90% poly-syllabic) for exploring syllable structure and syllabification pattern of PE were selected (list of the words is attached in appendix). All words were listened carefully and repeatedly then they were transcribed with syllabification and stress marks by using IPA convention. It was ensured that the tokens were produced by more than one speaker so that individual idiosyncratic pronunciation patterns could be avoided.

After exploring syllable structure and syllabification pattern, descriptive generalizations were made. Then, these generalizations were analysed in the framework of OT. For OT analysis, important step was to decide the proper ranking of constraints with the help of interaction of these constraints that is establishing language specific OT grammar. For this purpose, the researcher developed a method which is termed as ‘Violations Computing Method’ (VCM). In this method, all patterns or real data of any language variety is put in the right hand column and all relevant constraints are put on the top row to calculate the number of violations each ‘real inputs’ takes. After getting the summary of number of constraints violation, a relation of constraints violations and constraints ranking can be established. It is verified that higher is the number of violations, lower is the constraint in ranking. (for details, see Nadeem 2016).

3. OT and its Role in Description of Syllables

This section gives an overview of OT with a discussion of its relevant concepts and then presents various constraints. OT has been used in many recent works as a tool by many researchers to describe different linguistic as well as phonological processes. Although this theory was first proposed by Prince & Smolensky (1993) for describing the syllable structure of a language but soon it spread in other linguistic areas because of its wide application in all fields of linguistics. According to Gussenhoven and Jacobs:

> *Optimality theory phonology is thought of as a universal set of constraints which are hierarchically ranked on a language- specific basis. The relation between input and output is accounted for by respectively generating for each input all possible outputs and evaluating these outputs so as to select the optimal one. (1998, p. 233)*

OT is an expansion of "Generative Grammar" and was first proposed by Prince and Smolensky (1993). According to them Universal grammar consists of "constraints" instead of rules. And the individual grammar of any language is based on the proper ranking of these constraints. OT is different from earlier works in two ways. First, it does not offer individual grammars for description of rules like others, instead it presents "Gen" (Generator) which performs candidate analyses to generate many forms. According to McCarthy (p 8, 2002) "Gen is universal" which means that all produced candidates by Gen for a given input are the same in all languages. These candidates are varied. This property of Gen is what he calls "inclusivity or freedom of analysis".

Secondly, OT theorists, unlike other theorists, believe in the universality of constraints that they are not language specific, it is the hierarchy of the constraints which makes a language specific grammar. For the OT analysis of the whole data of one language about any linguistic feature, there is need of set of constraints on that feature which covers all generalizations and relevant processes of the phenomena. There is also space for the formulation of new constraint(s) or/and modification of some constraint(s) in OT analysis if established set of constraints does not cover the related linguistic process (es) of the language under discussion. So the set of constraints should be elaborative enough to accommodate all possible patterns in the presented data.

It also requires one consistent hierarchy of constraints (OT grammar) which should fit to evaluate only one optimal candidate from the multiple candidates. An optimal candidate is one which incurs fewer and least serious violations, i.e. violation of lower-ranked constraints as compared to all.

McCarthy (2002, 2008) discusses constraints typology by distinguishing two types of constraints in OT: (i) faithfulness constraints which ensure similarity between the input and the output candidate under evaluation. This type of constraints is considered "unique to OT". There is also requirement of "correspondence" for this optimal output other candidates. (ii) Markedness constraints evaluate the output form which should be permissible language structure or language inventories. This type of constraints demands the structural "welformedness" of the output forms. Many of the markedness constraints are also discussed in pre-OT literature, however, the interaction between these two types of constraints is a focal point of any OT analysis. The third family of constraints is "Alignment constraints"

McCarthy (p 10, 2002) summarizes the basic architecture of OT in this way:

Input → Gen → candidates → Eval → output

Syllable structure and syllabification of many languages and varieties of lanaguages are discussed in optimality theoretic framework. All those properties of syllable, its structure and syllabification are given the form of universal constraints in OT literature. Following are those different universal constraints on syllable:

1. *Complex-Onset (*Comp-Ons) or *Complex-Coda(*Comp-Coda): This constraint disallows tautosyllabic cluster, that is consonant or vowel cluster in a syllable, in the specified position. Sometimes combined into the cover constraint *Complex. It detains the occurrence of more than one C or V associated to any syllable position mode (McCarthy, 2002&,2008).
2. Cunsyll *or*Appendix (App): It requires that there should be no unsyllabified segment. Same as Exhaustivity (syllable) or Prince and Smolensky's faithfulness constraint "Parse" which bans deletion and FILL that bans insertion, Archangeli (1997) names "Faith C" and "Faith V" as faithfulness constraints. Faith V resists epenthesis of vowel in a syllable of output form if it does not occur in the input form. Whereas, Faith C stops deletion of any consonantal segment from the syllable of output form which occurs in the input form. Hammond (1997) calls it as 'faithfulness' which restricts the addition or deletion of any segment in syllable.
3. Nucleus/X (Nuc/X): It assures a segment in a syllable nucleus that belongs to sonority class *X*. Sometimes called Peak/*X*. It is replaced by the "The Nuclear Harmony Constraint" (HNuc constraint) in Prince and Smolensky (2004) according to that a nucleus with higher sonority value is more harmonic than one of lower sonority value.
4. No Coda: It ceases presence of coda in a syllable and favours open syllable (McCarthy, 2002& 2008).
5. Onset/X or Coda/X: It demands segment in the specified position that belongs to the sonority class *X*. Sometimes combined into the cover constraint Margin/*X*.
6. Coda-Condition (Coda-Cond): It rejects consonant place specification that is not linked with an onset consonant .Sometimes used as a cover constraint for a collection of restrictions on consonant clusters that includes the Coda-Condition proper. It obligates the stem final syllable to close the stem syllable.
7. Nucleus (Nuc) or Have-Nucleus (Have-Nuc): It refrains syllable without a nucleus. Same as Headedness (syllable). It is also named as "Peak" (McCarthy, 2002& 2008).
8. Onset: It requires one consonant before nucleus in a syllable (McCarthy, 2002& 2008).
9. Sonority-Sequencing (Son-Seq): It says that onset or coda cluster should appear with appropriate sonority profile by following Sonority Sequencing Generalization SSG, this is a common cover constraint for a family of constraints on the sonority profiles of tautosyllabic clusters (Prince and Smolensky, 1993; Archangeli, 1997; Kager, 1999; McCarthy, 2002 &2008).
10. LICENSING: It restricts the word-initial and word final consonants clusters according to phonotactic conditions of that language (Hammond, 1997).
11. Strict Layer Hypothesis (SLH): It suggests that every component lower in the hierarchy is properly dominated by an element one level higher (Selkirk,1984). According to Roca and Johnson (1999, p. 482) SLH requires that "Each phonological domain contains precisely

one or more phonological domains of the rank immediately below." They introduced it as a constraint to evaluate syllable structure of English word "sky". The violation of this constraint supports (Son-seq). To adjust extra-syllabic "s" in the onset of "spring" [spr☝☠] and "s, t" in the coda of "next" [n☜kst]. This violation is illustrated in Figure 1 (a) and (b).

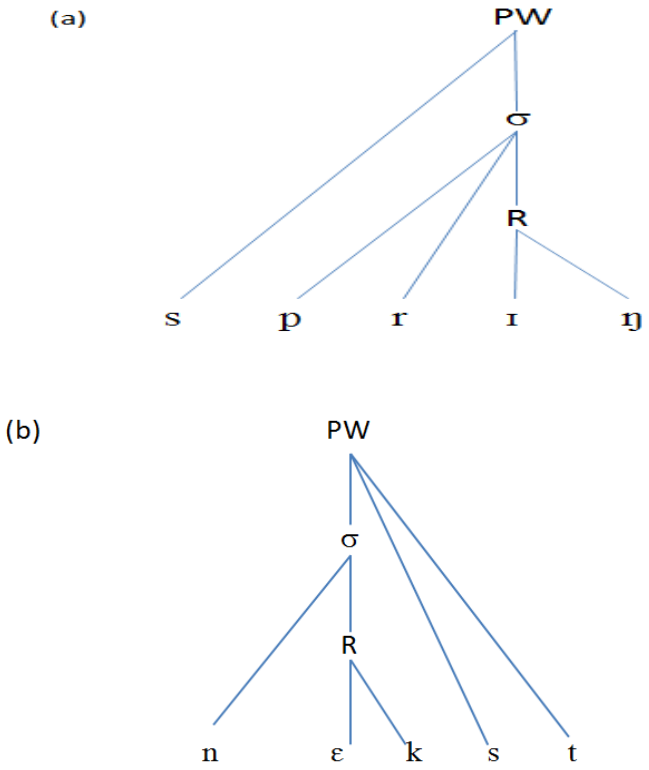

Figure 3.1:**Violation of SLH in (a) [spr☝☠] and (b) [n☜kst]**

In Figure 3.1 (a) extrasyllabic "s" leaves out its syllable and affiliates with phonological word (PW) node. Similarly, configuration in 3.1 (b) also exemplifies the direct linking of coda cluster "s, t" with higher domain by violation of SLH. This constraint also solve problem of all consonant clusters which violate SSG principle.

Levelt and Vijver (2004, p.206) categorise "Onset, No-Coda, *Complex Onset, *Complex Coda" as structural constraints by that they mean "that demand outputs to be structurally unmarked".

By ranking these above mentioned constraints, syllable structures and syllabification of different languages are analysed with the help of Optimality theoretic framework. OT does not only capture unmarked or general variations of a language but also marked features which are specific language distinctions.

Hammond (1997) gives the following complete hierarchy of English syllable structure constraints: Peak, Licensing, Sonority >> Faithfulness >> Onset, Nocoda, *Complex.

In this hierarchy, Peak, Licensing and Sonority are undominated constraints which come first followed by other three general constraints discussed above. In the end comes *Complex constraint which is low ranked in English because only few syllables allow more than one consonant at any edge of syllable.

Archangeli (1997) discusses OT model and its application in linguistics by giving constraints hierarchy of syllable structure of Yawelmani language spoken in California. She selects /xat-en/ as an input then she presents that how OT determines the optimal syllabification /xa-ten/ which represents two possible syllable structures, which are CV and CVC, by following constraints ranking:

Peak, Onset, *Complex, FaithC, FaithV>> Nocoda

(1997, p.12)

Roca and Johnson (1999) also present OT analysis of syllable structure of English by introducing a new constraint "Strict Layer Hypothesis (SLH)" to cover the dominance relation of Son-Seq in the syllables having consonant cluster with problematic /s/. After discussing OT analysis of syllabification patterns in English, they present the following final syllable constraints hierarchy:

*Complex^{coda}, Son-seq » Dep, Max» Onset, No-coda, *Complex, SLH

3.1 Syllable Structure of PE

This section presents syllable structure of poly -syllable words from PE. For showing their syllable structure dot "." is used to show the boundary of each syllable according to IPA tradition. The sequences of sounds in words are also shown in Table 1, in which C stands for consonantal sounds and V is for vowels.

Table 3.1: **Syllable Structure of Polysyllabic words of PE**

Sr no.	Words	Phonetic Transcription	Syllable Structure
1.	Import	[✋m.po▫❹rt]	(VC.CVCC)
2.	Mandate	[men.de▫❹t]	(CVC.CVC)
3.	bottle	[bɒ′.təl]	(CV.CVC)
4.	Report	[r★.po◹:rt]	(CV.CVCC)
5.	Return	[r✋.t🔍◹▫rn]	(CV.CVCC)
6.	Headlines	[hed.la✋◹nz]	(CVC.CVVCC)
7.	Research	[r✋.s🔍▫◹rt♦]	(CV.CVCC)
8.	Exports	[★ks.po▫◹rt]	(VCC.CVCC)
9.	Countries	[k★n.tr❩▫◹z]	(CVC.CCVC)
10.	Website	[veb.sa✋◹t]	(CVC.CVVC)
11.	Decade	[d★.ke▫◹d]	(CV.CVC)

12.	Preside	[pr.za.d]	(CCV.CVVC)
13.	Reply	[r.pla.]	(CVC.CVV)
14.	Demise	[d.ma.z]	(CV.CVVC)
15.	Support	[s★p.po.rt]	(CVC.CVCC)
16.	Protest	[pr★.te.st]	(CCV.CVCC)
17.	Survey	[s★r.ve.]	(CVC.CV)
18.	Destroyed	[d.s.tr.d]	(CVC.CCVVC)
19.	Venue	[v★.n.]	(CV.CVV)
20.	Sixteen	[s.ks.t.n]	(CVCC.CVC)
21.	Advise	[★d.v.]	(VC.CVVC)
22.	Extreme	[eks.tri.m]	(VCC.CCVC)
23.	between	[b.t.vi.n]	(CVC.CVC)
24.	assurance	[★.★.r★ns]	(V.CVV.CVCC)
25.	agreement	[★g.r.ment]	(VC.CV.CVC)
26.	Effective	[★.fek.tv]	(V.CVC.CVC)
27.	Individuals	[n.di.v.d★lz]	(VC.CV.CV.CVVCC)
28.	significant	[s.g.ni.f.ke.nt]	(CVC.CV.CV.CVCC)
29.	agricultural	[★g.ri.k★l.t.r.l]	(VC.VC.CVC.CCVC)
30.	appreciate	[★p.ri..e.t]	(VC.VC.CV.VC)
31.	Accompanied	[★.k.m.p★.na.d]	(V.CVC.CV.CVVC)

In the light of the above given analysis of the PE words, it can be deduced that following syllable structures are found in PE:

- V: as in arise [ə.ra.z]
- VV: as in ideal [a.d.əl]
- CV: as in detain [d.te.n]
- VC: as in import [.m.po.rt]
- CVC: as in regain [r. ge.n]
- CVV: as in bilateral [ba.le.trəl]
- CCV: as in protect [prə.tekt]
- VCC: as in extra [eks.tra]
- CCVC: as in substantive [səb.st.n.tv]
- CVVC: as in quantity [k.ən.t.ti]
- CVCC: as in research [r..s.rt]
- CCVV: as in climate [kla.me.t]

- CCCV: as in strategies [stre▫.tə.dʒiz]
- CCVCC: as in conference [kɒn. frens]
- CVVCC: as in appointment [ə.pəɪnt.ment]

In the above examples, each underlined syllable is demonstrating the syllable structure.

After exploring the syllable structure, following are the typical properties of PE syllable structure in multi-syllabic words:

- Both types of syllable, open and close, are found as in arise [ə.ra✋z]
- If a syllable contains only one segment it must be Vowel (see table 1 above)
- It allows onset as well as coda as in regain [r✋. ge▫n]
- CVC is most frequent syllable structure
- Tautasyllable that is CC at onset or coda position or VV as nucleus are also present, as in conference [kɒn. frens] and climate [kla✋.me▫t]
- Cluster of maximum two consonants is possible in the ONSET position word internally; although three consonant cluster is possible in the onset position of monosyllabic words such as "strict" (CCCVCC) or word initial syllable for example, stra.te.gy (CCCV.CV.CV)
- Cluster of maximum two consonants is possible on the CODA position of polysyllabic words; whereas, cluster of three consonants is possible in the coda position of monosyllabic words such as "next" (CVCCC)
- Maximum number of segments in one syllable can be FIVE whereas in monosyllabic words SIX segments are also possible as in "glimpse" (CCVCCC)
- Only mono or bi-syllabic words permit syllables with FIVE segments, words having three or more syllables contain syllable with no more than FOUR segments
- Un-syllabified consonants are not allowed
- Syllabic consonants C̩ i.e. [l̩] are also not allowed in PE

3.2 OT Analysis of Syllabification pattern in PE

This section deals with the description of syllable structures of PE in the framework of OT. It provides details of universal syllable constraints ranking procedure and interaction with one another, competition of different candidates and development of OT grammar of syllabification patterns in PE. OT model is applied on various inputs of PE by forming Tableaus. This section ends with the summary of OT grammar of syllabification patterns of PE.

In OT analysis, important issue is to decide the grammar, that is hierarchy of constraints. For this purpose, VCM is suggested as a useful method, the following table is prepared to show the dominance relation of the constraints for the ranking of these constraints on syllable patterns.

Table 3.2: **Syllable constraints ranking via VCM**

Syllables of PE	Peak	Faith C	Faith V	Onset	*Complex	No-Coda	SLH	Son-Seq

1. V	√	-	-	*	√	√	-	-
2. VV	√	-	-	*	*	√	-	-
3. CV	√	-	-	√	√	√	-	-
4. VC	√	-	-	*	√	*	-	-
5. CVC	√	-	-	√	√	*	-	-
6. CVV	√	-	-	√	*	√	-	-
7. CCV	√	-	-	√	*	√	-	-
8. VCC	√	-	-	*	*	*	-	-
9. CCVC	√	-	-	√	*	*	-	-
10. CVVC	√	-	-	√	*	*	-	-
11. CVCC	√	-	-	√	*	*	-	-
12. CCVV	√	-	-	√	*	√	-	-
13. CCCV	√	-	-	√	*	√	-	-
14. CCVCC	√	-	-	√	*	*	-	-
15. CVVCC	√	-	-	√	*	*	-	-
Total number of Violations:	0	-	-	04	11	08	-	-

In Table 3.2, the first column from the left shows syllables of PE and eight syllable constraints are presented in the top row. Symbol √ indicates NO violation of a constraint at the intersection of the syllable row and the constraint column and the asterisk symbol * shows the violation of a constraint. Whereas, the symbol (-) is used to show insufficiency of computing the (in)violation of constraint from the given data, which are the general patterns of syllabification in PE. It can be seen that in the above table four constraints, i.e. "Faith V, Faith C, Strict Layer Hypothesis (SLH) and Son-Seq" are filled with a (–) mark. The reason for Faith V and Faith C is that these are faithfulness constraints and can only be evaluated in relation to input and output, whereas VCM computes violations of the input only but not focusing on any output. While violation of SLH and Son-Seq constraints can be judged by looking at the affiliation of segment with the node in its hierarchy and sonority value of the segment respectively. The violations for these constraints can be accessed with the help of "violation tableaus" by providing words forming these syllabification pattern and by comparing optimal candidate with the sub-optimal candidates. The bottom row of Table 2 illustrates total number of violations made by syllable structure of PE with reference to each constraint.

In Table 3.3 a syllable constraint' violation summary is presented from top to bottom in order of increasing number of violations.

Table 3.3: **Syllable constraints' violations summary**

Sr no.	Syllable constraints	No. of Violations in PE
1	Peak	0

2	Onset	4
3	No-Coda	8
4	*Complex	11
5	Faith V	-
6	Faith C	-
7	SLH	-
8	Son-Seq	-

After getting the summary of number of constraint violation, a relation of constraint violation and constraint ranking can be established by a formula:

$$\text{No. of V} \propto \frac{1}{CR}$$

In this formula, V stands for violation, C for constraint and R for ranking. It states that number of violations is inversely proportional to the ranking of constraint. So, with the application of VCM, the grammar of syllabification pattern of PE can be described by the following syllable constraints hierarchy:

*Peak (undominated) » Onset » No-Coda » *Complex*

In this hierarchy, Peak is higher in ranking and is un-dominated by other three constraints because it shows NO or "0" violation. Then comes the Onset whose number of violations is "4" which is greater number of violation than that of higher-ranked constraint "Peak" but smaller than No-coda which shows "8" violations. The lowest-ranked constraint in this hierarchy is "*Complex" with highest number of violations, i.e. "8". Last four constraints in the table are not included in the hierarchy because of inadequacy of computing their number of violations from the generalized syllabification patterns. Interaction of unranked syllable constraints is presented below.

Now, the interaction of the unranked constraints, i.e. "Faith V, Faith C, Strict Layer Hypothes (SLH) and Son-Seq" can be ranked to finalize the complete domination relation of a full set of syllable constraints. As it is obvious from the properties of syllabification pattern in PE, the epenthesis and deletion of any segment from the syllable is not allowed, Faith V and Faith C constraints are also included in the undominated constraints. Then the ranking can be demonstrated in this way:

*Peak, Faith V, Faith C (undominated) » Onset » No-coda » *Complex*

Now the interaction of remaining two constraints, i.e. SLH and Son-Seq needs to be resolved. To accommodate the string of segments such as 'str' as in 'straight' and many other such sequences in the onset as well as coda position of the syllable, SLH has to be dominated by Son-seq, which means Son-seq should be higher in ranking than SLH and their dominance relation can be represented in the following way:

Son-seq » SLH

Finally, some logic is required to put these two constraints in the overall ranking. Before the issue of sonority sequencing rises, there must be violation of *Complex constraint that is why Son-Seq constraint needs to be placed before *Complex. It is also noteworthy that every complex form does

not need to violate SLH for the sake of avoiding violation of Son-Seq, therefore *Complex dominates SLH. Clusters in onset and coda position are allowed only if they follow 'phonotactic conditions' which are mostly favouring SSG; and if some permissible clusters (s, p/t/, r), as in "spring" and "strict", violate SSG then SLH will cover this violation, that is the reason to add Son-Seq as the undominated constraint. Keeping in view these points, the final syllable constraint' ranking of syllabification pattern in PE can be summarized as follows:

*Peak, Faith V, Faith C » Son-Seq (undominated) » Onset » No-Coda » *Complex » SLH*

3.3 OT Analysis of syllabification pattern in PE

This section presents OT analysis of syllabification pattern of PE which determines surface outputs by constraint; for a given Input. As a hierarchy of the syllable constraints has been set up above, it chooses the optimal form from a set of candidate outputs. This selection of the "harmonic candidate" in the syllabification pattern of word "rehearse" has been illustrated in Tableau 4 below.

Table 3.4: **Syllabification pattern in 'rehearse'**

Input: / r✋.h☜rs /	Peak	Fait h V	Fait h C	Son-Seq	Onset	No-Coda	*Complex	SLH
(a) → (r✋.h☜rs) (CV.CVCC)						*	*	
(b) (r✋h.☜rs) (CVC.VCC)					*			
(c) (r✋.h☜.rs) (CV.CV.CC)	*!							
(d) (r.✋h.☜rs) (C.VC.VCC)	*!							

In Table 3.4, constraints are arranged across the top of the tableau in domination order; each violation of a constraint is shown by an asterisk and the fatal violation of Peak constraint, which is un-dominated, is shown by asterisk and exclamatory mark; the symbol → is used to pinpoint the optimal candidate by following OT tableau tradition. Undominated constraints, which show no domination relation in the hierarchy, are presented in the columns with broken lines. Table 4 above shows that output (a) is selected as an optimal candidate with the violation of lower-ranked constraints. Whereas output (b) makes violation of higher ranked constraint Onset so it cannot be selected as winning candidate. Candidates (c) and (d) are also losers with fatal violation of higher-ranked constraint i.e. "Peak".

One difference in the syllabification pattern of PE and native English variety is that PE does not allow cluster of three consonants in the onset position of syllable occurring word medially. For the OT analysis of syllabification pattern word internally, a tableau of a word **/eks.trim/** from PE is provided to show how the grammar of PE, which is ranking of constraint, selects one optimal candidate. The violation Table 3.5 represents this analysis of word "extreme", in which this word has different syllabification pattern in native variety of English, i.e. **/ek.strim/** with cluster of three consonants in onset position in a word internally.

Table 3.5: **Syllabification pattern in 'extreme'**

Input: /eks.trim/	Peak	Faith V	Faith C	Son-Seq	Onset	No-Coda	*Comp	SLH
(a) (eks.trim) (VCC.CCVC)					*	**	**	*
(b) (ek.strim) (VC.CCCVC)					*	**	**	*
(c) (eks.tri.m) (VCC.CCV.C)	*!							
(d) (ekstr.im) (VCCCC.VC)					**	**	*	*

It is obvious from Table 3.5 that the above given ranking of constraints is unable to choose one 'winning candidate'. Output (a) and (b) are equally harmonic showing equal number of violations of the same constraints. Interestingly, (a) is a real candidate of PE and (b) is from a native variety of English. It infers that the above given syllabification pattern ranking is insufficient to analyze the difference of consonants cluster word medially of these two varieties of English. It means there is need for further constraint(s) in the hierarchy to analyze this difference. From the above analysis it is clear that PE does not allow complex onset of three consonants whereas the native variety of English does. To capture this difference there is need to add complex constraint with a difference of preference in the onset and coda positions. The *Complex constraint can be further specified into two constraints: *Complex-Onset (*Comp-Ons) CCσ or *Complex-Coda (*Comp-Coda) σCC. The symbol used for these constraints needs to be included in the ranking of PE syllabification pattern, which are modified as CCCσ and σCCC because it is demonstrated from the analysis of 'extreme' in Tableau 5 that the cluster of three consonant is prohibited in PE whereas cluster of two consonants and one consonant are allowed. So, these two constraints require to be ranked higher in the list of dominated constraints. Finally, the full constraint ranking for the syllabification pattern interaction is given below:

Peak, Faith V, Faith C, Son-Seq (undominated) »
CCCσ » σCCC » Onset » No-Coda » SLH

Now re-analysis of the word 'extreme' is presented with final full ranked constraints in Table 3.6:

Table 3.6: **Re-analysis of syllabification pattern in 'extreme'**

Input: /eks.trim/	Peak	Faith V	Faith C	Son-Seq	CCCσ	σCCC	Onset	No-Coda	SLH
(a) ☞(eks.trim) (VCC.CCVC)							*	**	*
(b) (ek.strim) (VC.CCCVC)					*		*	**	*
(c) (eks.tri.m) (VCC.CCV.C)	*!								
(d) (ekstr.im) (VCCCC.VC)						**	**	**	*

This re-analysis of 'extreme' on the basis of syllabification pattern of PE with inclusion of modified constraints successfully chooses the most harmonic candidate (a) from all other outputs (b-d) which make violations of higher-ranked constraints.

3.4 Summary of OT Analysis of syllabification pattern of PE

It is noted from the analysis of syllabification pattern of word 'extreme' that the general full ranking of syllable structure of PE is not sufficient to capture the difference of syllabification pattern of this word in PE. Hence, *Complex constraint is replaced by two modified constraints i.e. σCCC and CCCσ to evaluate the nonoccurrence of cluster of three consonants in the syllable of PE word medially. It is seen in the grammar of syllabification pattern of PE, total nine constraints are relevant. From which, following four constraints are undominated: Peak, Faith V, Faith C, Son-Seq; whereas remaining five have dominance relation given as follows:

CCCσ » σCCC » Onset » No-Coda » SLH

So, the overall grammar of syllabification pattern in PE is formulated by the following full ranking of nine constraints:

Peak, Faith V, Faith C, Son-Seq (undominated) »
CCCσ » σCCC » Onset » No-Coda » SLH

4. Conclusion

In the syllabification pattern, Pakistani English shows different behaviour in the division of consonants cluster word internally. It accepts cluster of three consonants in the syllable at the initial position or left edge of a word but disallows this cluster word internally; so breaking of cluster is done by placing maximum two consonants at the onset position of the second syllable instead of three as [eks.pres] instead of [ek.spres] , [eks.klɪ☩d] instead of[ek.sklɪ☩d] and [də.mɒns.tre□t] instead of [də.mɒn.stre□t]. This pattern shows that MOP is not followed in PE syllable structure. However, most of the syllable structures are similar to other varieties of English, as PE variety forms simple syllable structures such as V, CV, CVC but detains [C☩] as well as complex syllable structures with cluster of consonants at onset and coda positions, for example: CCV, VCC, CCCVCC, CCVCCC, CCVVCC. So, it also forms 'tautasyllable'which is a

syllable with cluster of consonants as in [glımps]or cluster of vowels as in [raım]; and in these complex syllables, the maximum number of segments is six as in [klaımb].

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Appendix

1. Abolished	36. Destroyed	71. Quantity
2. Accompanied	37. Detain	72. Recurrence
3. Accordance	38. Diplomatic	73. Referendum
4. Advise	39. Effective	74. Regain
5. Affidavit	40. Exclaim	75. Rehearse
6. Agreement	41. Exclude	76. Reply
7. Agricultural	42. Execute	77. Report
8. Ambassador	43. Exports	78. Representative
9. Announcement	44. Express	79. Research
10. Appointment	45. Extra	80. Residential
11. Appreciate	46. Extreme	81. Return
12. Archeological	47. Glimpse	82. Revolutionary
13. Arise	48. Headlines	83. Rhyme
14. Assault	49. Historical	84. Significant
15. Assumptions	50. Humanitarian	85. Simultaneously
16. Assurance	51. Ideal	86. Sixteen
17. Between	52. Import	87. Spring
18. Bilateral	53. Improvement	88. Straight
19. Boycott	54. Inaugurate	89. Strategies
20. Brutal	55. Individuals	90. Strict
21. Business	56. Inter-Ministerial	91. Substantive
22. Climate	57. Internalization	92. Support
23. Climb	58. Mandate	93. Survey
24. Commercial	59. Modernization	94. Sustainability
25. Complaint	60. Next	95. Tribunals
26. Complexity	61. Observatory	96. Unanimously
27. Condemned	62. Organizations	97. Unexceptionable
28. Conference	63. Overwhelmingly	98. Venue
29. Consequences	64. Parliament	99. Verdict
30. Consolidation	65. Perpetrator	100. Vicinity
31. Counterproductive	66. Personality	101. Website
32. Countries	67. Preside	102. Zero
33. Decade	68. Promote	
34. Demise	69. Protect	
35. Demonstrate	70. Protest	