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Analysis of Punjabi Syllable Structure

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Abstract   *The focus of this study is the analysis of Punjabi syllable structure in the light of Generative Phonology Theory. Under Generative Phonology, CV phonology theory is used for the analysis of the Punjabi syllable. CV phonology is a three-tiered model explaining the structure of the syllable. The data for this study is taken from native Punjabi speakers living in Lahore and its surrounding areas. Results of the study suggest that Punjabi speakers use four main patterns for Syllable construction, namely CV, CVC, V and VC.*

Introduction

This study gives a theoretical understanding of the Punjabi Syllable. Punjabi is originated from Proto Indo (Indo Aryan) languages. Punjabi is a transnational language, and its speakers are found all over the world. According to Ethnologue (M. P. Lewis, 2009), Pakistan is a multilingual country possessing seventy-two languages. Among all the languages spoken in Pakistan, Punjabi is spoken and understood by the majority of the people. The Punjabi language is graded among the top twenty most spoken languages in the world (Matthews, 2003); the Punjabi community in Pakistan is numerically the largest community of Pakistan, comprising 44.15% of the whole population of the country (The Government of Pakistan, 1998). The Punjabi language is widely spoken in the Pakistani and Indian provinces of Punjab. In Pakistan, there is 92,721,700 speakers majority of which live in the area of the province Punjab; however, in India, 29,258,970 people use Punjabi as their first language (Baart, 2003).

Punjabi belongs to Indo- Aryan group of languages which is a subpart of Indo-European languages. These languages are largely spoken in Pakistan, India, Bangladesh and other South-East Asian countries like Maldives, Nepal and Sri Lanka. The majority of the languages spoken in these areas belong to the Indo-Aryan language group. It extends to Chinese Turkestan and eastern Afghanistan (Masica, 1993). The map for Indo-Aryan languages in Subcontinent is given below.

Figure 1: Map of Indo-Aryan language adopted from (Masica, 1993)

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Punjabi is placed in a group called the northern-north-western group under the heading of the central-northern group of Indo-Aryan languages. Further, it is placed in the north-western group along with the Sindhi language, where it is further divided into west Punjabi called "Lahnda", with some other Indo-Aryan languages. Grierson (1906) has given the name "Lahnda" to Western Punjabi. "Lahnda" is the Punjabi word for "western. It is shown in the classification made by (Nigam 1972).
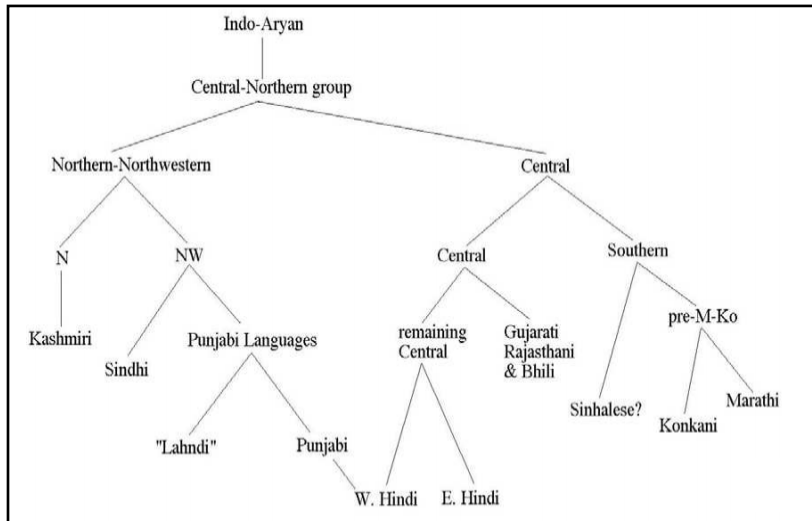

Figure 2: Nigram's (1972) classification of the Indo-Aryan languages (central-northern group)

Glottolog classifies Punjabi as a branch of Sindhi Lahnda, which is a branch of the Indo-Aryan Northwestern zone. The classification of Punjabi in Glottolog 4.4 is given in figure 1.4
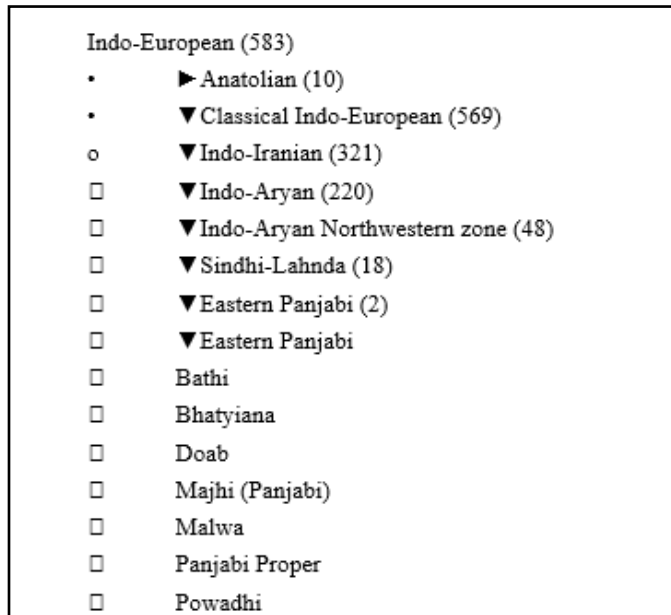

Figure 3: Classification of the Punjabi Language (Glottolog 4.4)

Punjabi syllable pattern has been discussed by many researchers, but their work is mostly descriptive. This work adopts CV phonology as a theoretical framework and provides a Generative account of The Punjabi syllable. CV Phonology theory was propagated by Clements and Keyser (1983), and it is a useful theory to analyze the syllable (Habib & Khan, 2019). This theory discusses three functions: to provide universal principles governing syllable structure, to explain the range within which the syllable structure of one language differs from another language (syllable typology) and to give rules which govern the syllable structure of a specific language (Clements & Keyser, 1983). CV Phonology theory envisions a syllable consisting of a three-tiered structure as immediate constituents: a syllable node, a CV tier and a segmental tier consisting of Distinctive features, which is representative of vowel-consonant segments (Habib, Naeem, Bhatti, & Khan).

Statement of the Problem

The researcher endeavours to give a detailed phonological description of the Punjabi syllable in the light of CV phonology.

Objectives of the Study

The main objective of the study is to identify, Describe, explain The syllable structure of Punjabi Language in the light of Generative grammar.

Methodology

The population for this study is Punjabi speakers living in the areas of Lahore. The data for this study is taken from two different sources. The first source is interviews that include structured, semi-structured and unstructured approaches. These approaches were adopted according to the need and time. The second source is focus group discussions. Four focus groups were made, and all the groups were given three topics for discussion. Both interviews and focus group discussions were recorded for further deliberation. In addition to it, notes were also taken during the interviews and discussions, which yielded useful data. A corpus of these words was made by using Python 3.8.6 and libraries of python for NLP named NLTK. This approach allowed the researcher to systematically arrange, organize and analyze the data.

Theoretical Framework

CV Phonology theory was promulgated by Clements and Keyser (1983), and it is a useful theory to analyze the syllable. This theory is used to study the syllable structure of a language. This theory discusses three functions: to provide universal rules that rule the syllable structure, to clarify the array within which the structure of a syllable one language differs from another language (syllable typology) and to give rules which govern the syllable structure of a specific language (Clements & Keyser, 1983).

CV Phonology theory envisions a syllable consisting of a three-tiered structure as immediate constituents: a syllable node, a CV tier and a segmental tier consisting of Distinctive features, which is representative of vowel-consonant segments. These layers are presented by the word /bɪn/ in the figure below.
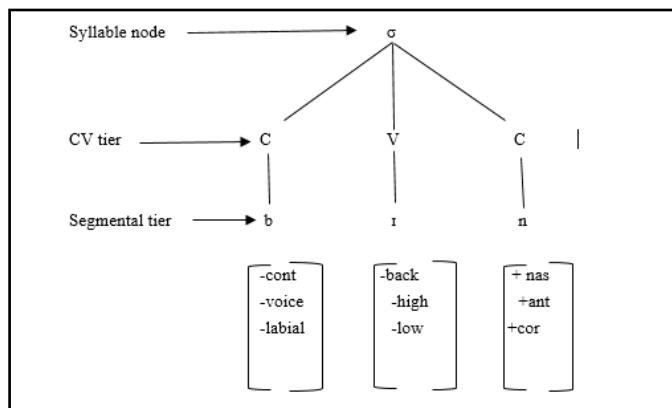

Figure 4: Syllable tiers

This model specifies that the CV tier is dominated by the syllable tier, which in turn is dominated by the segmental tier. Positions of C and V are functional and explain the difference between the peak and non-peak.
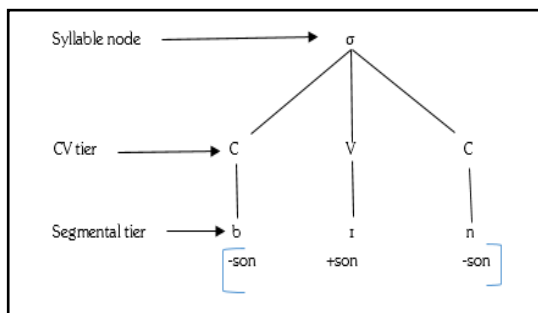

Figure 5: Syllable tiers mentioning sonority

From figure 5, it is evident that /ɪ/ is more sonorant; thus, it is the nucleus of the syllable. On the other hand, /b/ is [-sonorous] and /n/ is [+sonorous] but [-syll]; therefore, these two cannot be nuclear; hence, they are non-peaks.

Clement and Keyser provide a sonority chart that gives different positions to segments with different sonorities, as given in figure 6.
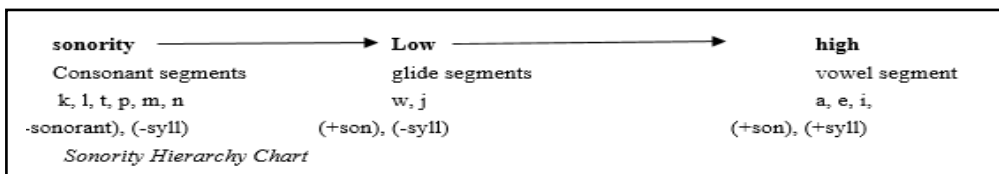
The above figure shows that the sonority increases as we move from consonant segment to glide segment and from glide segment to vowel segment and vice versa. It also indicates that all the vowel segments, due to their high sonority, are the peak of the syllable.
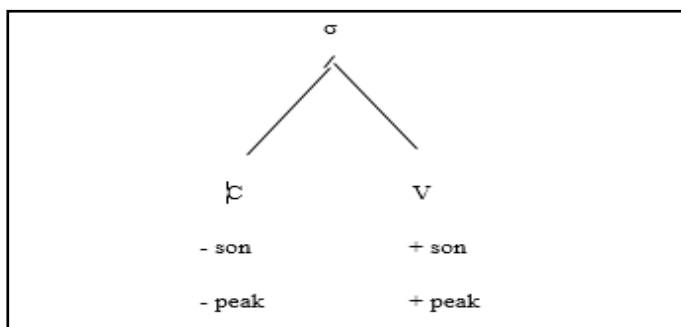

Figure 6: Sonority of peaks and non-peaks

This figure demonstrates that all the consonants due to low sonority are non-peaks. In consonants also, some consonants are more sonorant than the rest; for example, glides are more sonorant than the rest of the consonants like obstruents, but still, they cannot function as the syllable peak. The reason for this lies in the distinctive feature paradigm where they are seen according to place and manner of articulation. The air stream is impeded at different points in

the oral cavity, which shows that they are consonants and, thus, distinctively -sonorant while on the other hand vowel being uninterrupted in the airstream are distinctive + sonorant. It implies that on the basis of sonority, consonants cannot form the peak of the syllable, but vowels can be the syllable peak (Zivenge, 2009).

According to Clements & Keyser (1983), the CV tier dominates consonants and vowels. The principle governing this situation is that syllable is constituted by consonants and vowels at the segmental tier, but they perform different functions. These consonants and vowels make a CV unit which makes a syllable in CV tier, although they are different according to sonority strength. In the segmental tier, the segment dominated by the V is taken as the syllable peak while the segment dominated by C is non-peak, for example, in the word 'bin' /ɪ/ is the peak of the syllable and /b/ and /n/ are non-peaks.
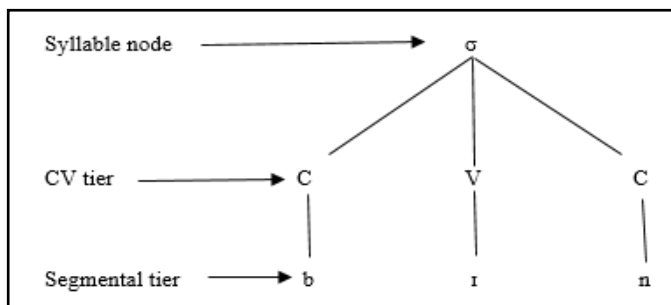

Figure 7: Tenants of CV Phonology

The above-mentioned figure also explains one of the core features of CV theory. It propagates that the V element in the syllable dominates the peak and is syllabic, and C is non-peak. It provides a universal principle that governs the consonant and vowel tier in what they call a well-formed syllable structure. The syllable containing the sonority peak like (CV) is not uniform, but other classes of syllable segments are also capable of performing the function of syllable peak, which mainly depends on the sonority strength. The Sonority Strength Hierarchy Chart is given below
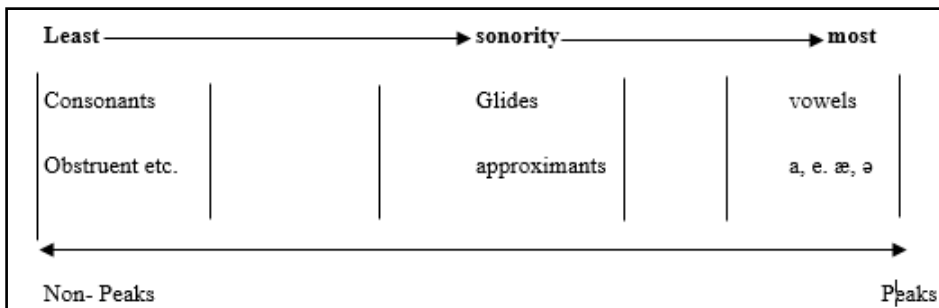

Figure 8: Sonority Strength Chart

This chart shows that sonority increases as we move from consonants towards glides and vowels. Vowels being the most sonorant, are capable of making peaks in the syllable, while consonants being less sonorant are unable to make a peak in syllable construction. Glides are more sonorant than the other consonants, but they are unable to form peaks because, in distinctive feature matrix, they are dealt with according to the manner and place of articulation which postulates the intervention in the airstream at certain points in the oral cavity. For this reason, they are categorized as consonants; hence, they are – sonorant. On the contrary, vowels are articulated without constriction in the air stream so, they are sonorant distinctively and are thus able to firm peaks. Thus, all the segments that fall in the vowel category are always the peaks due to their high sonority, as shown by the following illustration:
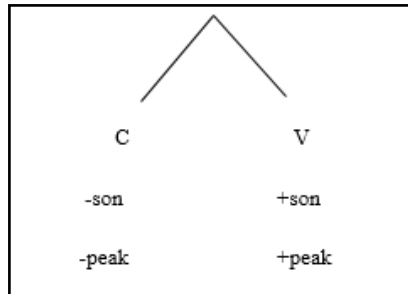
According to [Clements & Keyser (1983)](#), the CV tier dominates the consonants and vowels irrespective of the location on the sonority hierarchy chart. So, consonants and vowels are the segments unites constituting a syllable in the CV tier, although they are placed differently on the sonority hierarchy chart.

CV phonology propagates that the segments of the CV tier dominate the vowels and consonants. Therefore, vowels and consonants are the units of the CV and are the building blocks of the syllable. These units, although they are the constituents of the syllable yet they may exist at different places on the sonority hierarchy. Thus it can be concluded that the consonants and the vowels perform different functions at the segmental tier. This is shown in the figure below.
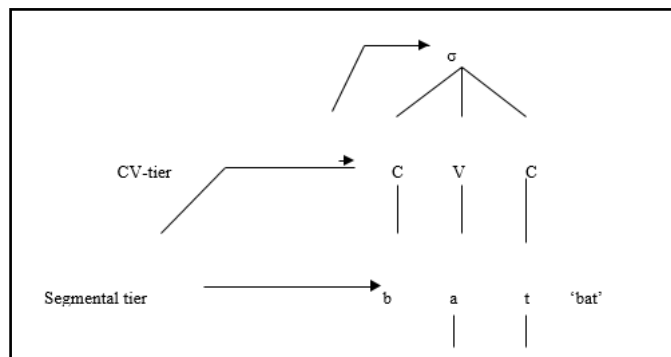
Figure 9: Constituencies of a Syllable

The figure indicates that the syllable has segmental tires dominated by C and V nodes. The tier dominated by the V node is the syllable peak, whereas the nodes dominated by C are non-peaks. Peaks in the syllable are always [+son] while others are [-syll] and [-son]. Hence /b/ and /t/ are [-son] and [-syll] while /a/ is [+syll] and [+son]. It also clarifies an important assumption made by CV phonology about the governance of the C and V elements. The part of the syllable which is dominated by the C elements are always unable to make peaks and are thus non-syllabic, while the part dominated by the V can make syllable peak and are thus syllabic. The CV phonology claims that the syllabicity in a syllable is the ability to make a peak. Hence, CV phonology provides a universal principle that can provide information about the consonant and vowel tier in a well-formed syllable condition in which sonority determines the ability of a phoneme to function as a non-peak or peak. The element with high sonority can make peaks while those with low sonority are unable to make peaks. Thus it provides a sonority hierarchy. *This sonority hierarch is discussed in figure 10.*
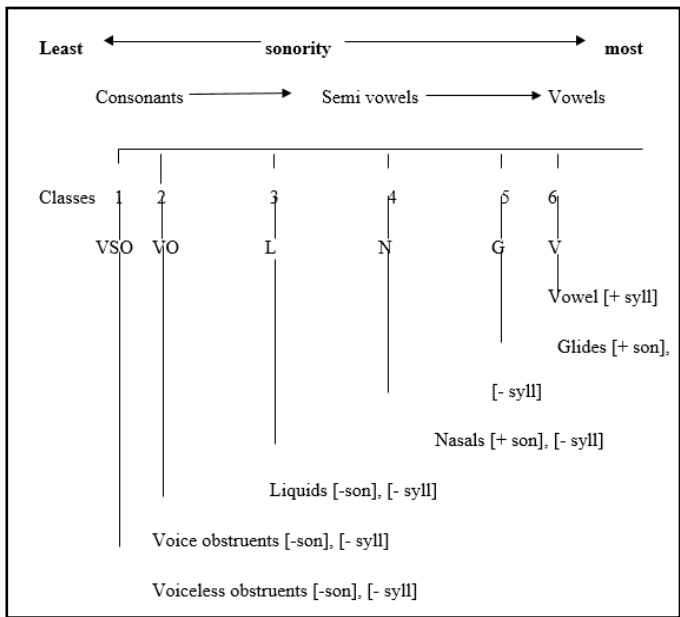
Figure 10: Sonority Strength Hierarchy

Translating the above sonority hierarchy chart shows that there exist a phonetic correlation between the voicing with the audibility of the sound. Sonority is the loudness of the sound in the sonority hierarchy. The more audible the sound is, the more sonorant the sound be. The sonority of obstruents are the least, and as we move towards the vowel, it increases. Thus, the chart gives us the order in which it increases: obstruent, liquids, nasals, glides, and vowels. Due to least sonority obstruent have fewer chances to get dominated by the V element. The liquids, glides and nasals remain at an intermediate level in the chart. In general, it will be easy to rank the segments on the sonority hierarchy chart, which in turn will determine the syllabicity of segments. The segment with relatively less sonority is least likely to function as a V element, while the segment with a relatively high sonority is likely to function as a V element and can create a peak in a syllable and thus become nuclear in a syllable. The fewer sonorant segments are dominated by the C elements and can become onset in a syllable. The following figure shows the system of the sonority hierarchy.
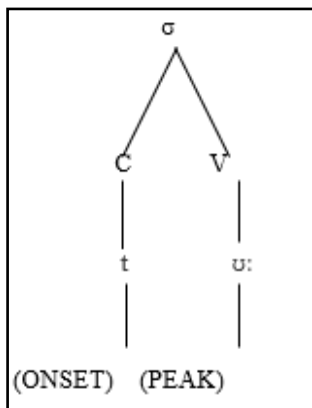

Figure 11: *Peak and onset in syllable structure*

The above figure describes the syllable algorithm. /o/in the syllable is dominated by the V element in the CV tier due to relatively more sonority and thus can function as nuclear. The

vowel /u/ is [+syllabic]. On the other hand, /t/ is [-syll] due to less sonority and, in turn, can be dominated by the C element.
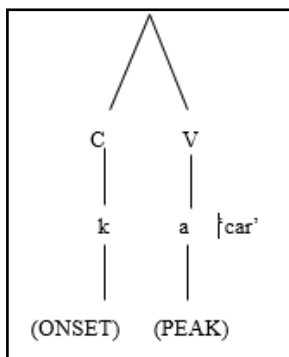

Figure 12: Peak and onset in syllable structure

Data Analysis

Punjabi Syllable Structure

This section describes the characteristics of Punjabi Syllable structure. Punjabi syllable structure is similar to Indo- Aryan languages. Generally, the Punjabi language does not allow consonants-cluster in both onset and coda positions. But there are few examples of more than one consonant present in both onset and coda. For example, the word /ʃkaʈ/ 'complaint' has two consonants at the onset position. On the contrary, the word /ɖɾəxt/ 'tree' has two consonants at the coda position (Kabir, 2000). Both open and closed syllables are permitted in Punjabi. The data for this study does not show any consonant cluster in Punjabi. Thus, the word like /ʃkaʈ/ and /ɖɾəxt/ is pronounced by addition of mid central vowel /ə/. All the instances in the data showed /ʃəkaʈ/ and /ɖəɾəxət/.

In this section, different types of syllables found in the Punjabi language will be given with phonotactic constraints. It will describe the ways of assembling the arrangements of C and V elements into the syllable. This arrangement is based on the constraints on the syllable configuration which in turn work as a filter. This filter allows only certain CV sequences to happen. An inventory of possible syllables in

Punjabi is provided in the table as follows, along with examples for illustration.

According to Clements and Keyser (1983, p. 159), "one of the functions of the syllable in all languages is defining syllabicity of segments". Thus, the syllable defines the combinations of C and V in words. In other words, the controls feature that makeup CV structures. Punjabi has a different combination of C and V combinations. Kabir (2000) provides the list of different configurations of Punjabi syllables, but after the investigation of data, it was found out that some of the configurations do not exist in the Punjabi speech corpus made for this study. The main syllable structures found in Punjabi are given in the next sections.

CV Syllable

A CV syllable is made up of a consonant and a vowel. According to Clements and Keyser (1983), the CV syllable is present in all the languages in the world; thus, it is the most preferred structure, and hence it is the core syllable structure. Punjabi language has this structure in greater number and is also mentioned by Kabir (2000). The figure below provides the CV syllable in the Punjabi language.
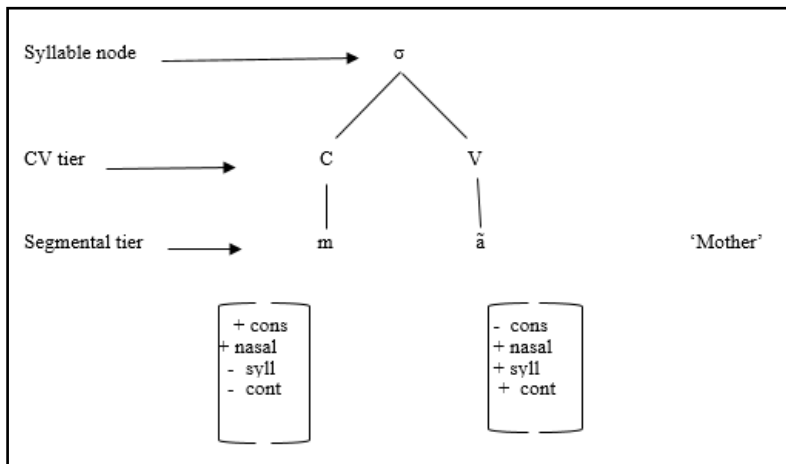
Figure 13: CV Syllable

Some of the examples of CV syllable is given in table 1.

Table 1. *CV Syllable*

Example	Gloss
mã	Mother
tũ	You
le	Aboard
lũ	Small hair
rũ	Cotton

Kabir (2000) has taken a long vowel as VV while Akidah (2013); Al-Ani (2014) considers VV as a single long vowel. Hence the CVV syllable for a long vowel is considered as the CV in this study, indicating a single long vowel. VV configuration is only used to mention branching peaks. In this dissertation, V: is taken as a long vowel while VV is taken for branching rhyme.

CVC Syllable

The second syllable type found in Punjabi is the CVC syllable. After the CV syllable, it is found more than any other type of syllable. CVC syllable comprises a consonant coming before and after a vowel. The figure below provides the CVC syllable in the Punjabi language.
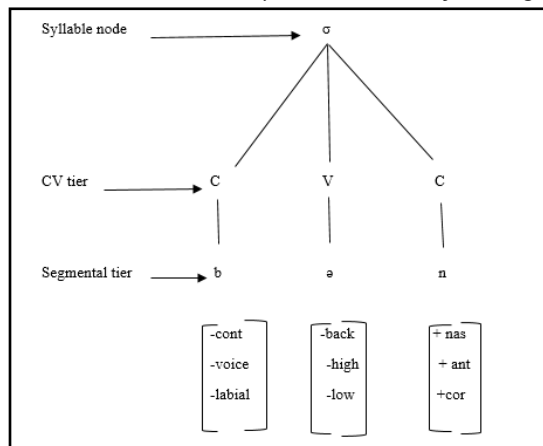

Figure 14: CVC Sullable
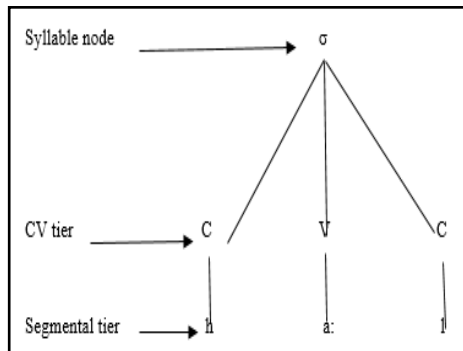
Some of the examples of CVC syllable is given in the table below.

Table 2: CVC syllable

Example	Gloss
sur	Melody
kən	Ear
bən	Wrap
ʧən	Moon

Here, it is important to note that the long vowel in this study is counted as a monophthong.

Hence, a word like /ha:l/ 'state of being' is treated in a similar way. It is mentioned in the figure below.


Figure 15: Long Vowel

V Syllable

The Punjabi language also possesses V type syllable configuration. This type of syllable excludes the onset consonant and the coda consonants. Hence, they are [-C+V] syllables with marginal elements missing. The V element constitutes the syllable nucleus in Punjabi because of its sonority, while the C elements are peripheral because they are non-sonorant (Clements & Keyser, 1983). It shows that V can constitute peak while consonants are unable to make peak and are thus, marginal. The figure given below shows the V syllable used by Punjabi speakers.
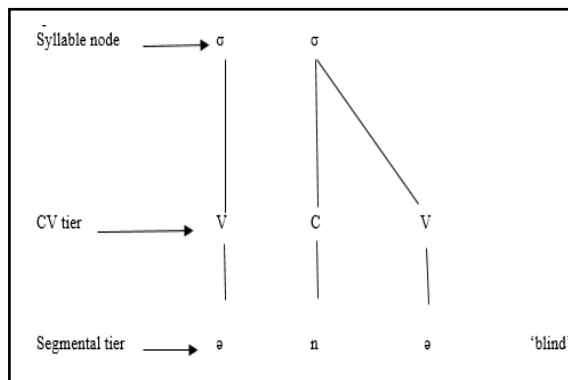
Figure 16: V Syllable

The above-mentioned diagram gives an example of V. CV syllables. Here the first syllable is only marked by one single node, which is the peak of the syllable, while the other marginal elements

are missing. Thus, the first syllable is /ə/, which is [-C+V]. Those syllables that are made up of a nuclear only [-C+ V] are just limited in number.

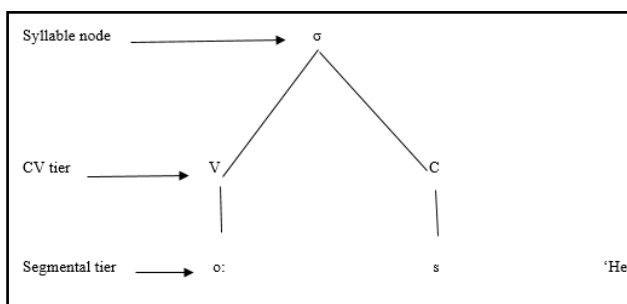Some of the examples of V or VCV syllables are given in the table below.

Table 3. V Syllable

Example	Gloss
a:	Come
ɔ:	That
əne	Blind
əmẽ	Mother
əba	Father
ulo:	Owl

VC Syllable

The Punjabi language also has VC type syllable configuration. This type of syllable excludes the onset consonant. Thus, it acquires a [-C+V+C] configuration. This is shown in the figure below.

Figure 17: VC Syllable

Some of the examples of VC Syllables are given in table 4.

Table 4. VC Syllable

Example	Gloss
ut^h	Get up
ɔ:s	Dew
a:ɳ	Coming
Utey	above

Conclusion

Clements and Keyser (1983) describe the CV syllable as a prototypical syllable. The CV syllable in Punjabi conforms to the obligations of core grammar. Other syllables which are mentioned above are amendments in the CV syllable structures. In Punjabi, the coda and the onset are optional, leaving the V typology; thus can be seen as ±CV±C where only the V element is obligatory and the rest optional. Punjabi shows both open and close syllable typologies where CVC, VC and CV types of syllables are allowed.

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