Hindko Syllabification and the Sonority Sequencing Principle

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Abstract

This paper aims to analyze the syllabification rules of Hindko dialect spoken in the region of Tanawal, Mansehra, Pakistan. The data was collected from two dictionaries, written in Peshawar and Abbottabad dialects of Hindko, and also by noting down the daily conversation of native speakers. It was phonemically transcribed and the syllable boundaries were marked. Later, the syllables were examined in light of the Sonority Sequencing Principle (SSP). The analysis shows that Tanoli Hindko syllables observe the universal principle of SSP. No example has been found which violates the SSP in its root words. The findings exhibit that the language allows a maximum of two consonants at each edge of the syllable.

Keywords: *Hindko, sonority sequencing principle, coda, onset, consonant clusters*

1. Introduction

Hindko is the second most widely spoken language of Kyber Pakhtunkhwa (KP), Pakistan; it is also spoken in Azad Jammu and Kashmir (AJK) and Punjab. The Tanoli Hindko dialect was selected for the current study, it is spoken by around 0.8 million people residing mainly in Upper and Lower Tanawal, located in the Hazara division of KP. The present paper is the first study on Tanoli Hindko which investigates the syllabification patterns of the language in light of SSP.

1. Literature Review

The term "sonority hierarchy" was first introduced by Hooper (1972). Phonetically, it's a common fact that vowels are more sonorous than consonants but languages have restrictions on the sequences of phonemes in their syllable structure. Various definitions and hierarchies are found in the works of linguists for the sonority system of a language. However, the present study includes a 10-point scale hierarchy given by Hogg and McCully (1987) cited in Yavas (2006, p.131).

Sounds	**Sonority Values**
Low vowels	10
Mid vowels	9
High vowels (and glide	8
Flaps	7
Laterals	6
Nasals	5
Voiced fricatives	4
Voiceless fricatives	3
Voiced stops	2
Voiceless stops	1

The above scale of sonority hierarchy shows that voiceless stops are least sonorous sounds while the low vowels have maximum sonority among sound segments. The sonority scale is also a helpful method to identify the number of the syllable in a word. Peaks of any utterance, which refer to the sonority of sounds, always remain more outstanding than any other segment in a syllable. Generally, vowels have higher sonority than consonants and, therefore, they keep the peak position in a syllable.

Regarding the peak, Clements (1990) indicates that all vowels have same sonority whereas Kenstowicz (1994) and Crosswhite (1999) are of the view that vowels are different in terms of sonority[1]. According to Hussain (2009), "Syllables are formed by high-sonority nuclei with falling sonority going outwards towards the edges of the syllable from this nucleus (onset and coda), as generalized as sonority sequencing principle" (p.5). Miller (2010) states that sonority 'involves the ability of segments to bear tone and occur as syllable nuclei' and within vowels, low vowels are the most sonorous sounds because of their high formant frequency while the high vowels have low frequency and that are the least sonorous sounds. In other words, SSP means the sonority in a syllable rises from the onset towards its nucleus and gets reverse in a similar way to the coda.

Initially, Jesperson (1904) proposes sonority ranking for onset and coda in the following way: that at the onset position t > s > d > z > n > l > r > w > whereas at the coda position w > r > l > n > z > d > s > t (cited in Khan, 2012). It shows that voiceless stops have least sonority and glides are the most sonorous sounds among consonants. According to Clements (1990), Jesperson's sonority scale is basic in its nature; however, it has influenced most of the later theories. In addition to sonority sequencing, some languages such as Spanish allow Minimal Sonority Distance (MSD) (Harris, 1983). It means that the languages maintain sonority between two phonemes in a syllable strictly, e.g., within obstruents.

Many phonologists (e.g., Hooper, 1976; Kiparsky, 1979; Harris, 1994 among others) are of the view that SSP is a universal principle. However, Butskhrikidze (2002) in Georgian and Rowicka (1999) in Polish describe that these languages have the surface violations against Sonority Sequencing Principle.

Davenport and Hannahs (2010) state, "It is clear that sonority hierarchy is not always conformed to within a syllable; it is possible in many languages to find the acceptable syllables, in which the segments in the onset or the coda are in the 'wrong' order. So, for example, English has words like 'stoat' and 'skunk'...similarly, German allows words such as Sprache 'language' with initial /ʃp/ or Strauss 'ostrich' with initial /ʃt/ " (p.76).

Majority of languages follows SSP whereas a few violate this syllabification principle, and it may not be a universal principle (Goldsmith, 1990). Rubach and Booij (1990, p.122-3); and Rowick (1999: ch.5) (cited in Ewen & van der Hulst, 2001) state that Polish is a commonly cited language which violates SSP because

[1] The present study deals with overall sonority of a syllable.

it allows maximum consonant clusters word initially. Khan and Bukhari (2014) opine that Pashto includes multiple violations of SSP in both bipartite and tripartite consonant clusters such as /ndror/ 'sister-in-law', /xkwəle/ 'beautiful', /skwərəʈə/ 'ember', /həbs/ 'humidity', /əks/ 'contrary / reverse'. Ranjha (n.d) claims that Urdu has mixed behaviour towards SSP whereas Bokhari and Pervez (n.d) argue that the syllabification algorithms of Urdu language strictly follow the SSP in all cases.

It shows that some languages strictly follow while others violate SSP. If appendages of the syllables are taken into account in languages, violation of SSP can be seen more easily. In the present study, prependices and appendices are not considered and only core syllables are analyzed in light of SSP.

2. Methodology

Data for the present study was collected from two Hindko dictionaries written by Sakoon (2002) and Awan (2008); however, both dictionaries mostly included the vocabulary used in other dialects of Hindko. Furthermore, for this paper, the data was also taken from the native speakers of Tanawal by recording their daily conversation at public places. The native speakers' help, in some cases, was also taken into account to find out syllabification of the dialect such as consonant clusters at onset position and coda position of a syllable. The native speakers were asked to pronounce the words three times and the sequences of sounds were marked accordingly on a piece of paper. In addition, the data was also recorded from 10 native speakers in the software Praat, and acoustically measured the consonant clusters at the onset and the coda positions of a syllable.

Data consisting of 5000 root words was taken into account and then it was transcribed into International Phonetic Alphabet (IPA). Only the root words of the dialect were selected in order to find out whether the dialect adheres the SSP or not. A sample for each phoneme was structured diagrammatically in light of SSP. The first part of the data analysis shows the sequence of complex consonants at both positions of a syllable, i.e. the onset and the coda. The second part displays the sequence of complex consonants at the onset position and a single consonant at the coda position of a syllable. Finally, it exhibits the sequence of complex consonants at the coda position and a single consonant at the onset position of a syllable. In case of geminate consonants, colon (:) is used at the final position[2] of the sound.

3. Data Analysis

The diagrams in the following sections are structured in a way that the less sonorous sounds are preceded by the sounds that are more sonorous followed by the most sonorous sounds and then falls towards the final edge of the syllables having more and least sonority of sounds. Likewise, in SSP, segments progressively increase to the peak and then decrease to the margins. First, the complex onset and the complex coda are structured in the following diagrams to show sequence of Tanoli Hindko phonemes in a syllable.

[2]Ewen and Hulst (2001) recommend colon (:) after geminate consonants like long vowels (p.155, see diagram, 87b & 92 c. p.157).

Combination of phonemes at the onset and the coda positions of Hindko syllables

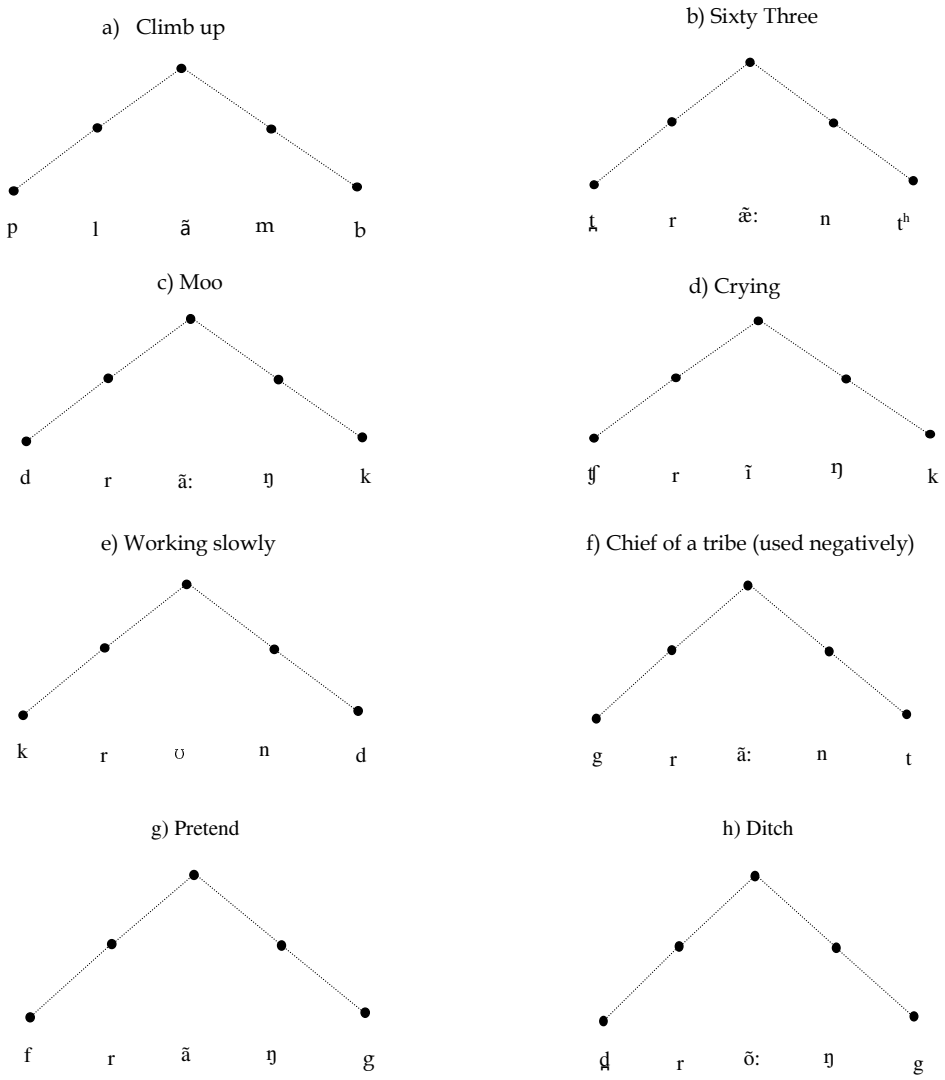

Figure 1: The role of SSP in clusters at both margins of Hindko syllables

The above diagrams show bi-partite consonant clusters at the onset and the coda positions in Tanoli Hindko. The dialect allows maximally two consonant clusters, and the sequences of phonemes indicate that the less sonorous sounds are followed by more sonorous sounds in rising position. On the other hand, at the

falling position, more sonorous sounds are preceded by the less sonorous sounds. For example, in Figure 1 (a), a bilabial unaspirated plosive /p/, in the word /plãmb/, is less sonorous sound which is followed by liquid /l/, i.e. more sonorous than the plosive. Then, the short vowel /ã/ occurs at the highest position in the diagram due to its sonority, which refers to the peak of the syllable. Later on, sonority starts the process of falling towards the final edge of the syllable, i.e. nasal /m/ and bilabial /b/ sounds at the coda position. Since the preceding sound /m/ is more sonorous than the following /b/ sound that adheres to the principle of sonority sequencing. It shows that the sonority profiles of the first part and the second part of the syllable follow the SSP rule.

The same tendency of the rising and the falling sonority is shown by the structures given in the rest of the above diagrams. Similarly, other such words in the data also exhibits that the consonant clusters at both position of a syllable in Tanoli Hindko obey SSP accordingly. However, the words containing two consonants at the onset and the coda position in a single syllable of Tanoli dialect are not much in frequency.

According to Nawaz (2014), Tanoli Hindko has 47 consonant clusters at the beginning of words. The phonotactic constraints in case of two consonants word initially is always limited to any of the following approximants /l/, /r/ and /ɽ/ as the second consonant of clusters. He also states that the first consonant of the onset clusters can be stops, nasals, fricatives or affricates except the impermissible clusters.

The following part shows the diagrams of two consonants clusters at the onset position followed by a singleton consonant at the coda position.

Complex Onset followed by Simple Coda

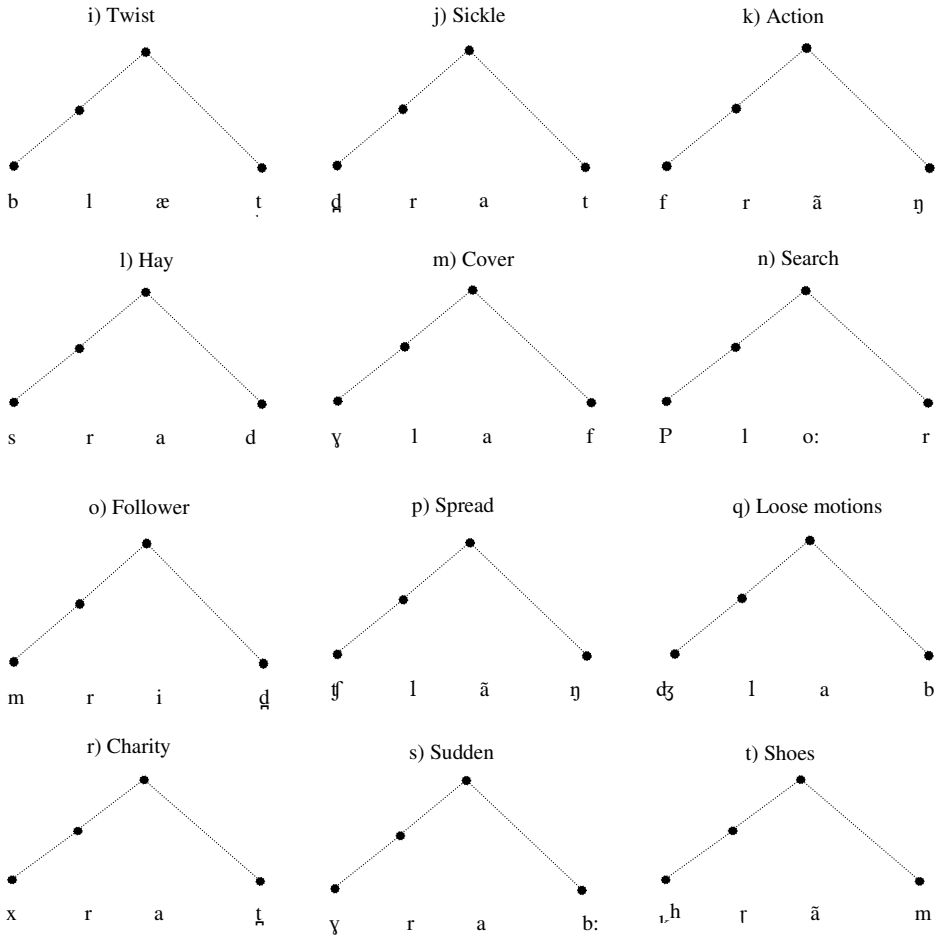

Figure 2: Onset clusters and coda

The above diagrams in the figure 2 shows the syllable structure in form of the complex onset and the simple coda by indicating the peak of the syllable in the words. All the examples exhibit well-formed word initial consonant clusters in the diagrams that adhere to the SSP. Such as the string of words like /ɖra:t/ 'sickle' contains consonant cluster at the onset position of the syllable. It displays that the voiced plosive /ɖ/ sound is less sonorous sound and rises towards more sonorous sound /r/, i.e. less sonorous than the short vowel /ɪ/ and this vowel stands at the peak position of the syllable. Then, sonority of string falls to plosive /t/ which is less sonorous sound than the peak/ɪ/. All the rest of the diagrams follow the same pattern of sonority in the word structure. Thus, it shows that the

sonority rises from the left edge of the syllable, reaches a peak (at the short or the long vowels), and then falls over the final cluster of the syllable.

Overall, the data reveals that all the onset clusters satisfy the SSP in Tanoli Hindko; and not even a single example violates this principle. In addition to the bipartite consonant clusters word initially, data of consonant clusters at coda position is also given in the following to examine how SSP works at word final clusters.

Simple onset followed by complex coda

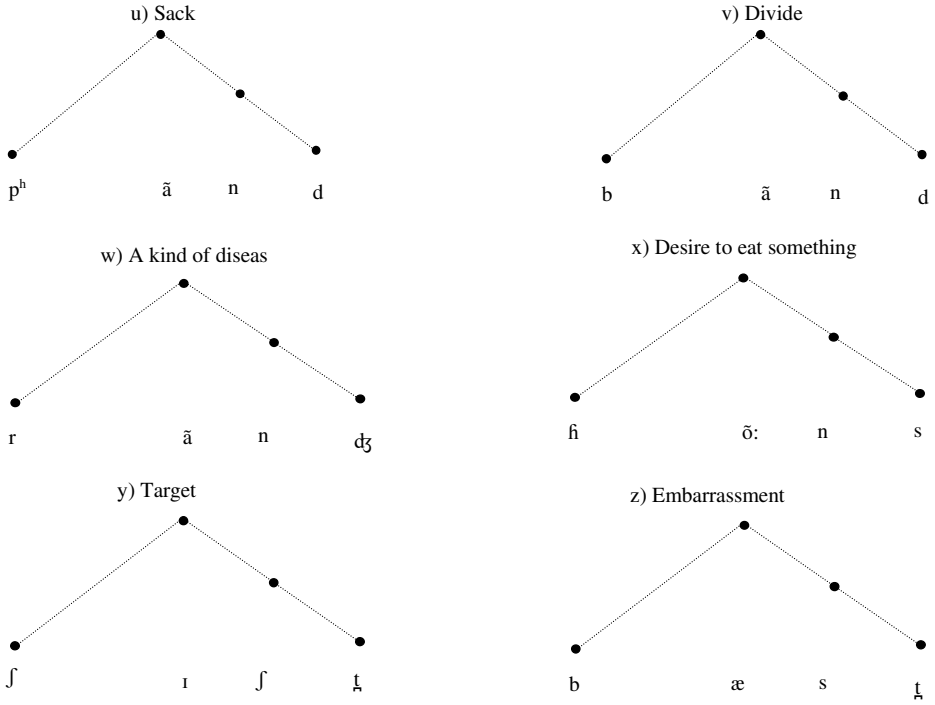

Figure: 3 Onset and coda clusters

The above diagrams show the simple onset and the complex coda. The dialect maximally allows two consonants at the coda position. The Figure 3(u) shows that /pʰ/ is less sonorous sound than short vowel /ã/ which is the peak in the syllable, thus, sonority rises from the /pʰ/ and reaches to the /ã/ and then falls over the final cluster. In case of the final cluster /nd/, the nasal /n/ is less sonorous than the /ã/ but more sonorous than the /d/. Therefore, the sonority gradually decreases from the more sonorous sound to the least sonorous sound.

It shows that like the fact of rising at the onset position, falling sonority also adheres to SSP in Tanoli Hindko complex codas.

In Tanoli Hindko, all the consonant combinations of coda are not possible clusters at onset position of a syllable such as nasals + stops; nasals + affricates; nasals + fricatives or fricatives + stops cannot make clusters word initially. The analysis exhibits that the dialect allows 15 consonant clusters at word final position (Nawaz, 2014). In Tanoli Hindko, it is one of the phonotactic constraints at the complex coda position that the first consonant is always limited to nasals /m/, /n/, /ŋ/ followed by stops or affricates or fricatives; and a few voiceless fricatives permit clusters followed by stops. Like the onset cluster results, not a single root word has been found at coda cluster which violates SSP in Tanoli Hindko.

In addition to the role of SSP in single syllable words, the data is also given in bi-syllable and tri-syllable words respectively in the following. The dotted lines in the diagrams (Figures 4 & 5) are used for showing the connectivity between the preceding and the following syllables within the given words whereas straight lines in the diagrams display segments in a single syllable of the structured words. As mentioned above that for long vowels and geminate consonants, the colon (:) is used at the final position of sounds to show their length.

SSP in Bi-syllable Words of Hindko

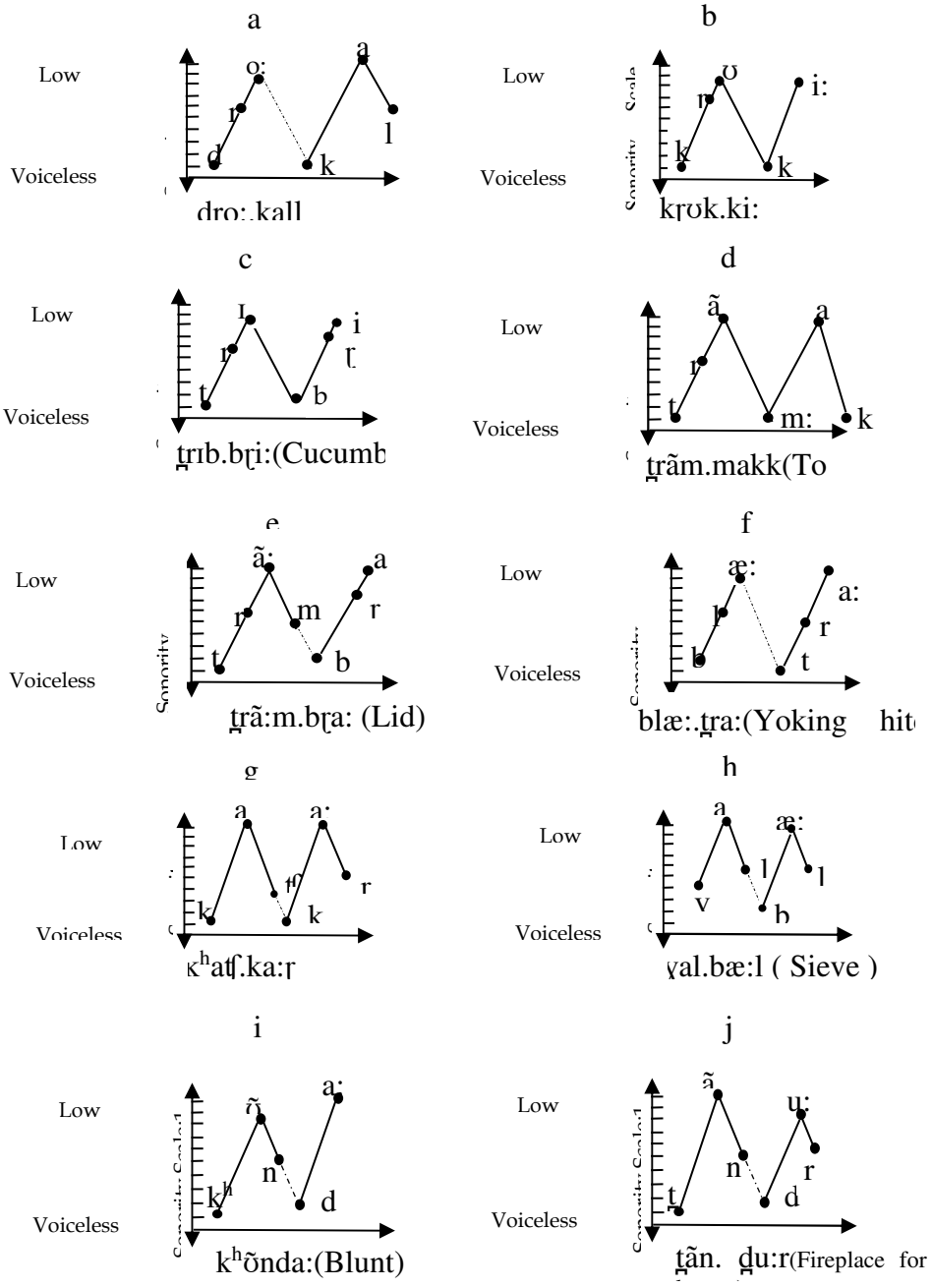

Figure 4: Role of SSP in bi-syllable words

The above figure 4 shows the bi-syllables words of Tanoli Hindko in form of open and closed syllables. Some of the words in the diagrams, from 4a to 4f, exhibit bipartite consonant clusters at the onset position of the first syllable containing stop sounds followed by /l/, /r/ and /ɽ/ sounds. Like the previous part of the study, the structure of the bi-syllable words also stick up for SSP. The two examples in the above figures 4c and 4f also display consonant clusters at the onset position of second syllable, i.e. /ʈrɪb.bɽi:/ and /blæ:.ʈra:/. In the prior case of the given words, geminate sound /b/ becomes coda of the first syllable and the onset of the second syllable followed by more sonorous sound /ɽ/ and then the sonority hierarchy reach to the peak /i:/ sound. In the latter case, the second syllable in the word /blæ:.ʈra:/, consonant cluster of /ʈr/ also remains firm to SSP in Tanoli Hindko. In other words, these examples and the other data reveal that word medial cluster in Tanoli Hindko also adhere to SSP like word initial and word final clusters.

Other examples in the Figure 4 show that all bi-syllables words remain stick by SSP, these are either open form syllables or closed form syllables. In addition, the data also show that /nd/ is possible cluster word finally in Tanoli Hindko and follow sonority hierarchy in form of decrease to the margins (see Figures, 3u, 3v, & 3w). However, when /nd/ occurs word medially in the dialect, it is split up as the coda of the first syllable and the onset of the second syllable such as the words like /kʰõn.da:/ and /ʈãn. ɖu:r/ (see Figures, 4i & 4j). This structure of the second syllable does not follow the Maximal Onset Principle rather splitting operation of coda cluster of /nd/ make the /n/ as the coda of the first syllable and the /d/ as the onset of the second syllable and thus it remains firm to SSP.

Furthermore, in Tanoli Hindko, if a short vowel occurs in CVC form, the following consonant geminates as CVCC (e.g. second syllable of 4a, 4b, 4c and 4d) whereas this rule is not applicable for a long vowel (e.g. first syllable of 4f and the second syllable of 4g and 4h).

SSP in Tri-syllables words of Hindko

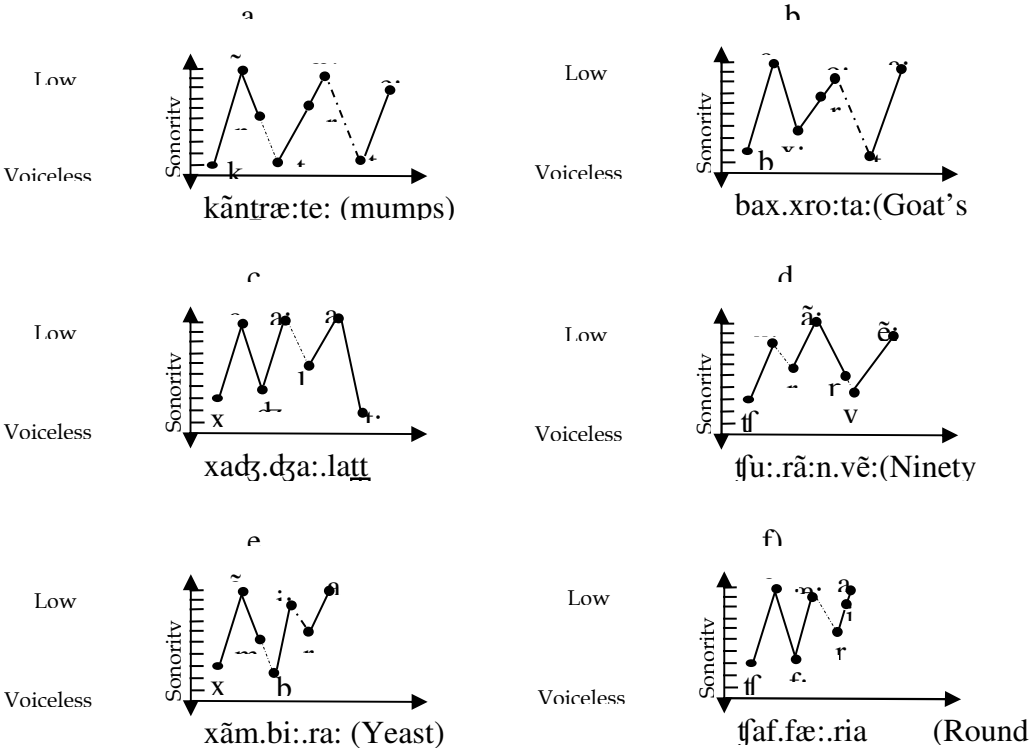

Figure 5: Role of SSP in tri-syllable words

In the above figure 5, the diagrams exhibit the structure of tri-syllable in light of the 10 points sonority scale. Like the single syllable and the bi-syllables analyzed in the previous sections, the above examples of tri-syllables also remain faithful to SSP in Tanoli Hindko. Data also reveals that tri-syllable words rarely make cluster word initially but allows cluster word medially such as in (5a) /kaⁿn. ʈræ:. te:/ and in (5b) /bax. xro:. ta:/. Both word medial clusters are the onset of the second syllable of the words and the preceding sounds of clusters, /ʈ/ and /x/, are less sonorous than the following sounds of the clusters, i.e. /r/ which shows the adherence to SSP. The diagram 5(f) depicts a diphthong /ia/ at the end of third syllable of the word /ʧaf.fæ:.ria/ which also follows the sonority scale. Overall, all the tri-syllables are in line with SSP and not a single example has been found during the analysis that violates sonority hierarchy in Tanoli Hindko. Moreover, tri-consonant cluster words are less in frequency as compared to single and bi-syllables words in the dialect.

4. Discussion

The above analysis of Tanoli Hindko shows that less sonorous sounds are preceded by more sonorous sounds at the onset position, and the reverse is found at the coda position in a syllable. The possible clusters are bipartite at the onset position, which allows the occurrence of stops or fricatives or affricates followed by /l/, /r/ and /ɽ/; and at the coda position, nasals are followed by stops or fricatives or affricates. The combination of fricatives + stops is also seen at the coda position.

On the basis of SSP analysis of Tanoli Hindko, therefore, sonority ranking constraints may be proposed in the following way: at onset position, segments of stop, fricative, affricate < approximants and at coda position segments of nasal > stops, fricatives, affricates; and segments of fricatives > stops. Hence, Tanoli Hindko observes this cross-linguistic universal based on the phenomenon of SSP, which govern the permissible sequences of consonant clusters within syllable accordingly.

Bokhari and Pervez (n.d) state Urdu strictly follows SSP while Ranjha (n.d) claims that it adheres mixed behaviour in its syllabification system in terms of the application of sonority. Davenport and Hannahs (2010) states English follows SSP; however, it violates this principle in some cases, such as the words 'stoat' and 'skunk' show the reverse order at onset position. Similarly, they also refer to German words, Sprache /ʃp/ and Strauss /ʃt/ that have also reverse sonority order. In the core syllables of Hindko, no syllable has been found which violates SSP.

Literature part of the present study shows that some languages violate SSP such as Rubach and Booij (1990) and Rowick (1999) state that Polish violates SSP because it allows maximum consonant clusters. They refer to a Polish word /nastmpstf/ means 'consequence' where SSP violation can easily be observed. Khan (2012) reports that Pashto, a major language of Pakistan and Afghanistan, includes multiple violations of SSP in bipartite and tripartite clusters both word initially and finally.

The results show that Tanoli Hindko also allows clusters word finally in form of fricatives and stops so its obstruents keep the minimum value of one MSD. Thus, these results are similar to Spanish which allows MSD within the obstruent.

Additionally, Tanoli Hindko has 31 consonants, 9 oral vowels (three short and six long), 6 nasal vowels, and 2 diphthongs. Short vowels are found in closed syllables while long vowels are permissible in both open and closed syllables (Nawaz, 2013).

5. Conclusion

In the root words of Tanoli Hindko, the application of SSP in bipartite consonant clusters follows the sonority hierarchy strictly in terms of rising towards the peak and then progressively falling to the edge of the syllable. Moreover, at the coda position of a syllable, MSD has also been maintained between fricatives and stops[3] such as /paʃʈ/ 'defeated severely', /ʃiʃʈ/ 'aim', /bæ:sʈ/ 'insult', and /saxʈ/ 'hard' that keep the minimum value of one.

Generally, not a single word in Tanoli Hindko has been found which occurs in reverse order of sonority. However, Pashto is also spoken in KP but allows sonority sequencing in its root words. Overall, it is evident from the analysis that Tanoli Hindko follows the SSP in its syllable structure.

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[3] The language like Spanish maintains MSD strictly between two segments such as fricatives + fricatives or fricatives + plosives have the same value (see Harris, 1983).

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