CONSONANT CLUSTERS IN TIBETO-BURMAN LANGUAGES : AN OPTIMALITY –THEORETIC APPROACH

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AMRENDRA KUMAR SINGH

CENTRE OF LINGUISTIC & ENGLISH
SCHOOL OF LANGUAGE, LITERATURE AND CULTURE
STUDIES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI-110067
INDIA
2005

Date:

CERTIFICATE

Certified that this Dissertation entitled **"Consonant Clusters in Tibeto-Burman Languages: An Optimality-Theoretic Approach"** submitted to the Centre of Linguistics and English, School of Language, Literature and Culture studies, Jawaharlal Nehru University, New Delhi for the award of Master of Philosophy is an original work and has not been previously submitted, in part or full, for any other degree or diploma of any University. This may, therefore, be placed before the examiners for evaluation for the award of the degree of Master of Philosophy.
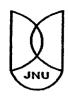
Prof. P.K.S.Pandey

Supervisor

Prof. S.K.S

Chairperson
Acting Chairperson
CL&E/SLL&CS

DECLARATION BY THE CANDIDATE

This Dissertation entitled **"Consonant Clusters in Tibeto-Burman Languages: An Optimality-Theoretic Approach"** submitted to the Centre of Linguistics and English, School of Language, Literature and Culture studies, Jawaharlal Nehru University, New Delhi for the award of Master of Philosophy is an original work and has not been previously submitted, in part or full, for any other degree or diploma of any University.

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Amrendra Kumar Singh

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Acknowledgements

- General Facts with Illustrations

- Critical Discussion on consonant clusters in relation to Optimality Theory.

Acknowledgements

ABBREVIATIONS

Obs.	Obstruent
Son.	Sonorant
G	Glide
FC	Fricative
PL	Plosive
ST	Stop
AF	Affricate
L	Liquid
N	Nasal
C	Any Consonant
Vd.	Voiced
Vl.	Voiceless
NC	Not Clear
NA	Not Available
[	Word boundary
T-B	Tibeto-Burman

CHAPTER I

INTRODUCTION

1.1. This dissertation deals with the constraints working on the patterns of possible, permissible consonant clusters in Tibeto-Burman languages of India. The representation of consonant clusters in any phonological phenomenon raised the interest of linguists to look for the reasons which affect the structure of any phonological input by targeting the phonological processes. This brings up two questions of theoretical interest. First, why do cluster processes occur? One possible answer is that they act as to improve the syllable structure (e.g. Steriade 1982, Borowsky 1986, Itô 1988, and Blevins 1995); another is that they improve the perceptibility of stop place cues (Labov 1997, Hume 1998, Côté 2000, Steriade 2001). Second, how does a language choose among possible cluster processes? In Optimality Theory (Prince and Smolensky 1993), the choice is uniquely determined by the language-specific constraint ranking. In this work, the purpose is not to look upon the patterns of consonant clusters in T-B languages but to generalize the universals of the occurrences of clusters in the languages along with the variation or marked properties of the languages concerned, the ways in which how the languages of this family choose a particular pattern of cluster among the possible clusters.

The patterns concerning consonant clusters are extremely diverse in Tibeto-Burman languages, as can be seen in the fourth chapter along with the language-specific clusters. The Himalayan languages like Chaudangsi, Darmiya, Pattani, Tinnani, Purki etc. generally permit clusters at all the three positions in the words but languages like Jad, Tod, Spiti, Nyam-Kad, Chhitkuli etc. permit clusters word-initial and word-final only. The languages in the North-Eastern region of India generally give a very different picture as far as the occurrences of consonant clusters are concerned. The languages like, Thadou, Kului, Mising, Hamar, Karbi, Ao-Naga, Nagamese, Mao-Naga, Angami, etc. do not permit consonant cluster at the word-final position rather they permit clusters either at the word initial position or in the word-medial positions. There are certain sounds which form clusters with a particular sound only, or so to say, the cluster formation of fricatives sounds is very different, e.g., in Mising, /s/ forms cluster in the word medial position with /k/ and /t/. Likewise, in Kului, /s/ forms cluster with /p/ph/G, while the other fricative sound like /š/ forms cluster with /j/ and /r/.

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So, the variation in the patterns of occurrence of consonant clusters is really very challenging to generalize any harmony in their occurrences.

The Tibeto-Burman language family which is stretched from Himalayan ranges to the Northern-Eastern part of India, is found to have a lot of variations among the languages, that encouraged me to look into the characteristics of the languages and to apply the recent theoretical understanding of the language to expect some appealing response of the concerned languages of this family. However, the languages taken under study for this work are less in number but it should be taken as a preliminary attempt to study the basic idea about the structure of this work.

1.2. Hypothesis:

The language-specific permissible clusters are very much in numbers as it has been already made clear that the languages in the Himalayan regions have different kinds of patterning from the languages in the North-East regions. In Optimality theoretic approach to the study of language, it has been the case of taking constraints as a universal phenomenon that work on any specific features of the language e.g. syllable structure, sentence pattern, word formation processes etc. prohibits the other possible outputs of the given inputs. In 1978, Greenberg presented his typological study of some of the languages across the world and generalized the fact about the behavioural patterns of consonant clusters in the world languages. The Tibeto-Burman languages have a lot of variations in their structure as far as consonant clusters are concerned. Out of the data of 36 languages, there are very less number of languages which generally follow the same pattern to give any clue of generalized pattern about the occurrences of consonant clusters in the languages concerned. The languages of this family sometimes do not follow the universals as suggested by Greenberg. So, the optimality-theoretic constraint working on the patterns of occurrences of consonant clusters in these languages would be of interest to see perceptibility of the universal constraints and to look for the need of some alternative theoretic approaches that would be more abstract in its nature.

1.3. Methodology:

The data of the Tibeto-Burman Languages of India has been collected from the Grammar books of the languages concerned. The methodology implied in this research work is inductive in nature. The patterns of consonant clusters of the languages are taken not only from the description of the consonant clusters but also from the basic word lists and the words used throughout in the books. As this research work is primarily concerned with the concept of universalism in the language, the languages taken into consideration have been picked up randomly throughout the area as per the availability of the sources. The pattern of the occurrences of permissible consonant clusters in the languages available show variation at all the three levels whether it is initial, medial or final positions in the words.

The major quest to decide whether the adjacent consonant are really clusters or two consonant hanging together across word boundary has been taken care of by looking at the syllable structure of the languages. The words which are having more than one syllable have been taken for the adequate analysis of the patterns of consonant clusters. This study is based on the data available from the languages which are very less in number as the available languages in this family are more than 400 (approx.). The variation in the features among the languages is very much diverse.

1.4. Organization of Chapters.

The first chapter deals with the body of this work by giving the general understanding of the consonant clusters and the theoretical answers to the problems related to the universals of the language. Here, the purpose of this research work has been explained in detail. The chapter 2 deals with the problems related to the classification of T-B languages along with different approaches related to the classification of these languages. The chapter 3 deals with the review of literature and theories related to the study of consonant clusters in the

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world languages and various principles governing the behaviour of consonant clusters to look for the universal nature of language.

The chapter 4 deals with the patterns of occurrences of consonant clusters in T-B languages studied in this work. The generalizations have been drawn regarding the permissible consonant clusters in these languages at all the three levels i.e. word-initial, word-medial and word-final positions of the words. The optimality-theoretic constraints have been discussed in details to get the general idea about universal constraints working on these languages along with critical discussion on the problems of the universal nature of the language.

CHAPTER II

TIBETO-BURMAN LANGUAGES OF INDIA

2.1. Tibeto-Burman language family

The Classification of Tibeto-Burman (T-B) languages has always been a challenge for linguists. According to Grierson (1909:12), B.H.Hodgson was the first to recognize the unity of the T-B languages. Grierson credits Max Muller (1854) with having attempted the first classification of T-B languages. As it is very much clear from the 'Global Surveys of T-B languages' that the classification varies, e.g. the treatments of T-B given by Shafer (1966-70), Voegelin and Voegelin (1964-66), and Benedict (1972 a) form parts of works that attempt to cover the whole of Sino-Tibetan, while Grierson (1903-28) and Konow's treatment of T-B in the 'Linguistic Survey of India' forms part of a geographically defined survey which includes other families as well. In 1997, Bradley's 'Tibeto-Burman Languages and Classification' is the most recent and the most extensive up-to-date survey of Tibeto-Burman languages. In 1996, Matisoff's invaluable compendium Languages and Dialects of Tibeto-Burman gives an exhaustive listing of languages and dialects. Even the language names present their own problems. Many are referred to in a myriad of ways, with different names used by different outsiders and still another names used by the people themselves. Sometimes certain groups even have multiple names for themselves. Therefore, we can mark out the difference of opinion in the classification of languages right from the work of Shafer i.e. Introduction to Sino-Tibetan, I-V Vols, (1966-73) to Srestha Charya Tuladhar in 1976.

Tibeto-Burman Languages which are regarded as part of the Sino-Tibetan family (Sino-Tibetan speaking people are associated in the Literature with the Neolithic 'Yang Shao' culture which originated in the central plains of Northern China. Eventually this group of Sino-Tibetan speakers split into 'sinitic', which is essentially Chinese and Tibeto-Burman)[1] are located in the mountainous northern and north eastern border countries of South Asia. There have been scholars who doubt the classification of Tibeto-Burman as a subfamily of Sino-Tibetan. Maspero (1938), in his review to Shafer (1938), objected to the use of term Sino-Tibetan to refer to a genetically related group of languages. He recognized Tibetan and Burmese as a single family but was not in favour of any classification on the level of Sino-Tibetan.

Fig.1 Affiliation of Tibeto-Burman, after Benedict (1972a:6)

In the above diagram, Tibeto-Burman is co-ordinate with Karen within a grouping labelled in "Tibeto-Karen", and Chinese and Tibeto-Karen are in turn co-ordinate members of Sino-Tibetan. This assumption of Benedict has been followed by Matisoff and others. Later, several other hypotheses came into light, but were in favour of Austro-Thai, according to which Miao-Yao, Kam-Sui, and Thai are seen as members of Austro-Thai rather than member of Sino-Tibetan. The position of Karen in Fig.1 was into debate when scholars like Forrest (1973: 21-22) and Egerod (1974a) places it within Sino-Tibetan but with links to Austroasiatic. When it comes to classify the Tibeto-Burman languages or the sub-groupings of languages of within this family, it varies, as the names of the languages, the geographical locations, differ from person to person.

The languages may be classified typologically, as tone languages, mono-syllabic languages in the study of language universals (Greenberg 1963, 1974) but the basis for genetic groupings of the languages are not an easy task. The Burmic division given by Shafer (1955, 1966) is quite different from Egerod's who classified Burmic languages as kuki-chin and grouped Ao and Lapcha as separate groups of Naga branch and Mikir and Meithei and other languages like Luish and Nung languages as separate groups. Shafer categorised Ao and Lapcha as a single group under Ao-unit and Meithei and Mikir as separate branches. Here there is a slight difference in the classification of the languages. Benedict (1972), on the other hand, categorised Kuki-Naga in a different fashion and took languages under consideration which are different from others. Along with the

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differences in the classification, there is a harmony in the classification too (Mikir and Meithei as separate branches). The same language referred to by two different names in two different classifications. The description given in the 'Global Surveys of T-B languages'[2], presents a clear picture of the difference in the classification.

2.2. Tibeto-Burman languages of India

The great mass of Tibeto-Burman speakers is in Tibet and Burma, and approximately 6.8 million are found in Asia, where they live in the southern slopes of Himalayas, in Assam, Manipur and Tripura (4.2 million in India, 1.8 in Nepal, 6, 50000 in Bhutan and about 1, 50000 in Bangladesh.). As regards the number of representatives and the variety of their forms, TB is the richest language family in South Asia. *Linguistic survey of India* (LSI) gives a total of 113 of Tibeto-Burman languages and 82 dialects spoken on the modern territory of India and Bangladesh alone. Many of the Tibeto-Burman languages have scarcely been studied in any detail, which means that their classification is far from satisfactory. As far as South Asia is concerned three branches can be distinguished as various groups and subgroups.[3]

Zograph[4] has proposed the following classification:

a) Tibeto-Himalayan branch:
a).1. Tibetan group- This is the most important group of languages, spoken mainly to the north of the Himalayas, in the southern slopes of the Himalayas and in India. Several Tibetan dialects which are in use have been grouped under the general name of 'Bhotia', is spoken by 2, 50000 people in India. Some of the eastern dialects are spoken in Bhutan and Nepal and a series of dialects in Kumaon and Garhwal regions of Indian Territory and the western dialects including *Laddakhi, Balti,* and *Purki* are spoken in Baltistan and Laddakh regions.

b). The Group of Pronominalised Himalayan languages – In this group of languages personal pronouns representing the subject, occasionally also the

object of the sentence, can be added in suffix form to the verb. The western group of these languages are spoken

in the extremity of Uttar Pradesh and Himachal Pradesh, for e.g. *Manchati, Lahauli, Bunan, Rangloi, Kanasi, Kinnauri, Darmiya* etc. In the eastern part of the language group most of the languages are spoken in eastern Nepal and the adjacent region of India

c). The Group of Non-Pronominalised Himalayan languages- In this group of languages pronominal suffixes do not occur. These languages are spoken in the central and eastern Nepal, Sikkim (India) and in Bhutan. They include *Rong* or *Lepcha* (Sikkim, India), *Newari, Gurung, Mangri* etc. (Nepal).

d). The North-Assamese branch- There are several groups of languages spoken in the North-eastern region of India territory.

d.1. Bodo-Bara group- The languages of this group are spoken mainly in Assam (the Bodo Autonomic council area) and in Tripura for e.g. *Dimasa, Garo, Lalung* etc.

d.2. Naga languages- The languages of this group are further subdivided into the following subgroups:
1. Western- e.g. *Angamese, Sema, Rengma* etc.
2. Central- e.g. *Lotha, Ao, Tengsa.*
3. Eastern- e.g. *Koniak, Vanco, Sangtam* etc.
4. Naga-Kuki- These languages are spoken in the south of the other Naga languages in Manipur, e.g. *Mao-Naga, Thankhul, Maring, Mikir* etc.

Graham Thurgood and Randy J. LaPolla (2003) presented classification T-B of languages in '*The Sino-Tibetan Languages*', which has been followed in grouping the languages taken for the present study. The West Himalayan languages into two groups as Kinauri (Kinauri, Marchha, Johri, Kanasi etc.) and Almora (Chaudangsi, Darmiya etc). It comes under the rubric of Rung Branch, consisting of rGyalrong languages, the Dulong languages, the Kiranti languages,

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the Himalyan languages, Kham, Magar, and Chepang. Burling (1983) has established this subgouping (The Sal languages or Bodo-Konyak-Jinghpaw) on the basis of shared innovations. In this branch, Garo comes under Bodo-Koch, and other languages in other groups (Konyak, Jinghpaw). The Kuki-Naga-Chin Branch has been classified as the Ao group, the Angami-Pochuri group, the Zeme group, the Tangkhul group, the Mizo-Kuki-Chin group (this group is further subdivided into Chin and Kuki languages), Mikir group and Meithei group.

As the classification of these languages varies, it would be easier to group them as subgroups as suggested by the different linguists and it is given in the table below:

Branch	Groups of languages	Languages	Area	
Rung Branch	West-Himalayas languages.	Kinauri-Johari, Marchha, Jad, Gahri, Kinnauri, Pattani, Tinani, Kanasi, Nyam-Kad, Chhitkuli, Tod, Spiti,	Pithoragarh (Kumaon Hills)	
		Almora-Chaudangsi, Darmiya,	Garhwal regions.	
	Western-Tibetan languages.	Laddakhi, purki,	Leh (Jammu and Kashmir), Ladakh (Jammu and Kashmir)	
Kuki-Chin-Naga Branch	Ao Group	Ao, Lotha	Chungli (standard Ao language, Nagaland),Workha (Nagaland)	
	Angami-Pochuri Group	Angami, Sema, Mao	Kohima (Nagaland), Zunheboto (Nagaland), Senapati (Manipur)	
	Thankhul Group	Thankhul, Maring	East district (Manipur),	
	Naga Languages	Naga-Bodo	Kabui	Nagaland
		Naga Group	Nagamese	Dimapur (Nagaland)

	Mizo-Kuki-Chin languages	Northern Chin Thadou	Manipur
		Kuki Mizo, Hmar	Mizoram
	Meithei Group	Manipuri (Meiteilon)	Manipur
	Mikir Group	Karbi	Karbi Anglong (Assam)
Tani Languages	Western-Tani	Apatani	Subansiri (Arunachal Pradesh)
	Eastern-Tani	Mising, Mishmi	North Assam, Nagaland
Bodo-Konyak-Jinghpow (The Sal Languages)	Bodic Group	Central Monpa, Kului	NA
	Garo group	Garo	NA

Table 1. Distribution of Tibeto-Burman languages in India

* The places or the areas of the languages are not mentioned in the respective columns because, the source materials referred for the data were from the basic word lists from the books which did not contain the specific area of that language.

In the above table 1., Naga Languages have been taken into a single group, as Voegelin-Voegelin (1977), Egerod (1974), Shafer (1966) and Bendict (1972) have classified Naga languages into a single branch i.e. Naga-kuki languages or somewhere as into kuki languages only. Though there is a difference in the classification of these languages, we can see a common understanding about the languages also. So, these languages have been put together into a single branch for convenience. Benedict and Egerod have classified Garo under the rubric of Bodo-Garo languages. Therefore, Bodic languages and Garo as separate group classified under a common branch. The Ao group, Angami-Pochuri group, Mikir group and Meithei group have been included into the common branch, i.e. Naga-Kuki-chin by Shafer, Voegelin and others too. (for further information, see *Research on Tibeto-Burman languages*, by Austin Hale, 1982).

2.3. Selected Languages for the Research Work.

The languages taken under study for this research work are 36 in numbers and are mentioned in the table given above. These languages have been taken randomly

as per the availability of the sources and the data is collected from the secondary sources i.e. from the grammars books of the languages concerned. It has been taken care that the data should not be based on the description provided in the books but to look upon the basic word lists or words in the books throughout. So, the patterns given in the next chapter do have some differences with the description given in the sources. Actually, earlier it was the motive of this research work to have at least 50 languages for study but due to unavailability of the sources, I had to restrict this study to 36 languages. The languages, under consideration, for this research work are mentioned in the table 1.

CHAPTER III

REVIEW OF LITERATURE AND THEORY

The interest in the study of the structure of language and some general principles governing the linguistics constituents of the languages started in the classical period, when the intellectuals simplified the structure of the language by looking at its basic units and tried to generalize some statements about the facts concerning the language. In Europe and America, the philologists endeavoured to describe the structure of the language in a search for the similarities and differences to mark out the common principles operating behind the structures of various languages. The search for universals of language was a common drive to go into the details of the structure, as it can be marked out right from the beginning to the present times. Several approaches came into light throughout the past decades. The Europeans' approach to the study of language, took the first step of coming out with some overwhelming similarities of the facts of language. The linguistic study in Europe witnessed a dimensional departure from the 17th and the 18th century linguistic traditions with the advent of 19th century, which had centred on the search for universal logical structures of language.

Due to the impact of French rationalism, the early grammarians described grammatical features in philosophical terms and tried to analyze different languages in the mould of Latin Grammar. The pursuit of this approach in linguistics studies led to the composition of philosophical grammars, conforming to the general principles of logic, and to the development of the concept of normative grammars in Europe, which later acquired a theoretical basis in the 18th century. The difference between speech sounds and written symbols was not clear to them. They failed to distinguish between actual speech and written symbols and seemed inclined to prescribe arbitrary rules for the description of languages. This paved a new way to the study of language, which was later identified as comparative linguistics in 19th century.

The advent of 19th century witnessed the emergence of historicism and comparativism in the field of linguistics. The linguists of the period, called comparativists, directed their linguistic talent, energy and zeal to the comparison of different ancient languages of the Indo-European family, which, according to William Jones, had sprung from a common source, which no longer exists. Linguists like Franz Bopp (1791-1867)[5], Rasmus Kristian Rask (1787-1832)[6] and

Jakob Grimm (1787-1863)[7], the founding fathers of comparativism, led the foundation of a systematic comparison of different languages of the Indo-European family. Following Rask, Grimm with his copious data, showed the relevance of sounds in the evolutionary process. He further presented a detailed account of phonology and morphology of all the Germanic languages. But, Grimm's systematic exposition of the correspondences of consonants between the Germanic and other Indo-European languages, commonly known as Grimm's Law, was of overwhelming significance to the next generation of linguists, as it underscored the significance of phonology and the laws of sounds in comparative study of languages. Thus, it can be seen that the early approach to the study of language was to compare the structure of the languages whether it was grammar, speech sounds, word formation processes etc. to see the relationship between the languages and to foresee the structure of the parent language. The growing significance of phonology within the field of Indo-European linguistics was further reflected in the writings of August Frederich Pott[8], Verner (1872), Hermann Paul (1846-1921)[9] and other linguists of the time. In the 19th century, linguistic studies were predominantly historical in nature, and were mainly based on the Indo-European classical languages. They paid little attention to the problems concerned with the theory and nature of language.

The beginning of the 20th century saw a sharp change of emphasis with the study of the principles governing the structure of the languages being introduced by Ferdinand de Saussure (1857-1913)[10]. It classified sentences into simple, compound and complex. The functions of the various constituents of a sentence are described. Words are classified into Parts of speech and the sentences again sub-classified in various ways as declarative, interrogative etc. The constituents of a sentence are further classified for e.g. N (noun) as a countable noun, common noun, an animate noun and a human noun. Likewise the speech sounds of the languages are also classified depending upon the place and manner of their articulation.

The focus of the study of language shifted from the structural analysis to the knowledge of language. The search for the universals of language that started from Ferdinand De Saussure took a different shape when Chomsky (1957)

presented generative approach to the study of language and defined grammar as an explicit account of an ideal speaker-hearers' intrinsic competence. This was equivalent to a system of rules that assign structural description to each of the infinite sentences of a language.

'The generative approach to language description proposes a collection of statements, rules or axioms which describe, define or generate all well-formed utterances in a language'[11].

It consists of some conditions to allow a particular segment to appear in a particular environment.

e.g. (a) A→B in the environment of X___Y
$$Z$$

Where A, B, X, Y, Z are symbols of particular alphabet or zero, and '→' can be read "is to be re-written as".

(b) C→D in the environment of X___Y
$$Z$$

These two rules can be coalesced into -

A→B   in the environment of X___Y
C→D   Z

* (These rules have been merged into a single rule in accordance with the *simplicity* of the rules, as the required environment for both rules is same.)

Thus, the generative grammar postulates rules to generate several alternatives to choose the required output. Morris Halle (1962) presented output of innumerable possible sequences from a fixed set of rules. He showed a great number of the distribution of sounds within the given sequences and formulated rules to derive the other possible sequences in the language concerned. This approach to the study of language further suggests a possible solution to some of the traditional puzzles of historical linguistics.

Kisseberth (1970) presented some more facts about the functioning of phonological rules and showed that the structural sameness of the rules doesn't

allow them to combine into a single one. It proposes that the unity of a set of rules may not rest upon the similarity of their structural descriptions, but rather upon the similarity of their *function*. Or to put it differently, rules may be alike in having a common effect rather than in operating upon the same class of segments, or performing the same structural change. By giving the phonetic representation of clustering of consonants and of vowels in *Yawelmani*, he showed the functional unity of phonological rules. In the study of heavy constraints working on the phonetic representations of clustering of consonants and vowels, he showed the relevance of the ordering of rules in a way to generalize the patterns of occurrence of sequences to cover the possible output.

Greenberg[12] (1978) took another step forward and proposed a study to look for the general quest for universals in languages by taking consonant clusters into account. He presented a general account of the universal nature of the consonant clusters in the world languages.

By giving the statistical account of the sample of 104 languages, Greenberg proposed 40 universals regarding initial and final clusters taken from different language families to generalize the possible clusters which are obeyed by almost all languages.

While generalizing the fact about combinations of consonant clusters, medial clusters have not been taken into account because such combinations are often very large and many of the sources utilized in his study of universals contain statements regarding initial and final clusters only. The possible clusters at the word-initial and word-final positions, as suggested by Greenberg are as follow-

1. For initial and final systems, if $\underline{x}$ is the number of sequences of length $\underline{m}$ and $\underline{y}$ is the number of sequences of length $\underline{n}$ and $\underline{m} > \underline{n}$, and $\underline{p}$ is the number of consonant phonemes, then $\underline{x} \leq \underline{y}$.

$$p^{ᅿ} \quad p^{ᵃ}$$

2. For initial and final systems, if $\underline{x}$ is the number of sequences of length $\underline{m}$ and $\underline{y}$ is the number of sequences of length $\underline{m}$ and $\underline{y}$ is the number of sequences of length $\underline{n}$, and $\underline{m} > \underline{n}$ and $\underline{n} \geq 2$, then $\underline{x} \leq \underline{y}$.

3. Every initial or final sequences of length $\underline{m}$ contains at least one continuous subsequence of length $\underline{m\text{-}1}$.

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4. In all initial and final systems, if there are sequences of length m and n and $m > n$, then the proportion of sequences of length m which only occur with internal morpheme boundaries is equal to or greater then the proportion of such sequences which occur of length n. since every word boundary will also be a morpheme boundary, it is sufficient to state the above generalization in terms of morpheme boundaries.

5. There are no initial or final systems in which all obstruent combinations are heterogeneous in regard to voicing.

6. In final systems the existence of at least one sequence consisting of a nasal (voiced or unvoiced) followed by a heterorganic obstruent implies the existence of at least one sequence consisting of a nasal (voiced or unvoiced) followed by a homorganic obstruent.

7. In initial systems the presence of at least one combination of stop + stop implies the presence of at least one combination of stop + fricative.

8. In final systems the presence of at least one combination of stop + stop implies the presence of at least one combination of fricative + stop.

9. In initial systems the existence of at least one fricative + fricative combination implies the presence of at least one stop + fricative combination or at least one fricative + stop combination.

10. In final systems the existence of at least one fricative + fricative combination implies the presence of at least one stop + fricative or at least one fricative + stop combination.

11. An unvoiced stop in initial systems is never preceded immediately by a stop differing only by voicing, and in final systems is never immediately followed by such a stop.

12. In final systems a voiced stop is only followed immediately by a stop differing only in being unvoiced if there is a morpheme boundary between them.

13. No succession of consonants only differing in that one is unvoiced and the other is glottalized occurs in initial or final systems unless there is a morpheme boundary between them.

14. No combination of a voiced and glottalized obstruent is found in either initial or final systems.

15. In initial and final systems a lateral is never followed immediately by an r-type sound. In initial system the sequence r + lateral only occurs with morpheme boundary.

16. In final systems, clusters with two members never consist of a hushing followed by a hissing sibilant.

17. In initial systems the existence of at least one sequence containing a liquid, whether voiced or unvoiced, immediately followed by an obstruent implies the existence of at least one sequence containing an obstruent immediately followed by a liquid.

18. In final systems, the existence of at least one sequence containing a stop immediately followed by a liquid implies the presence of at least one sequence containing a liquid followed by a stop.

19. Voiced semivowels are not followed by obstruents in initial systems or preceded by obstruents in final systems.

20. Two successive voiced sonants are always followed by a vowel in initial systems and preceded by a vowel in final systems.

21. Except for voiced nasal followed by homorganic unvoiced obstruent, an unvoiced consonant or sequence of unvoiced consonants in initial systems immediately preceding a vowel is not itself preceded by one or more voiced consonants.

22. In initial systems the presence of at least one sequence of voiced nasal + unvoiced homorganic obstruent implies the presence of at least one sequence of voiced nasal + voiced homorganic obstruent.

23. In final systems, except for unvoiced obstruent followed by a voiced nasal, an unvoiced consonant or sequence of unvoiced consonants following a vowel is not followed by one or more voiced consonants.

24. In initial systems the existence of at least one sequence consisting of a voiced liquid followed by a nasal implies the existence of at least one combination consisting of a nasal followed by a liquid.

25. In final systems, the existence of at least one sequence consisting of a nasal followed by a liquid, a nasal followed by a nasal or a liquid followed by a liquid implies the existence of at least one sequence consisting of a liquid followed by a nasal.

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26. In initial systems the existence of at least one combination consisting of two voiced obstruents implies the existence of at least one combination consisting of two unvoiced obstruents.

27. In final systems, the existence of at least one combination consisting of two voiced obstruents implies the existence of at least one combination consisting of two unvoiced obstruents.

28. In initial systems the existence of at least one sequence of voiced obstruent + nasal implies the existence of at least one sequence of unvoiced obstruent + nasal.

29. In initial systems the existence of at least one sequence of voiced obstruent + semivowel implies the existence of at least one sequence of unvoiced obstruent + semivowel.

30. In final systems the existence of at least one combination of sonant + voiced obstruent implies the existence of at least one combination of sonant + unvoiced obstruent.

31. In initial and final systems an unvoiced sonant is never immediately preceded or followed by another unvoiced sonant.

32. If a language has at least one cluster containing n glottalized consonants, it has at least one cluster with $n - 1$ glottalized consonants.

33. In initial systems the existence of at least one cluster consisting of nasal + liquid implies the existence of at least one cluster consisting of obstruent + liquid.

34. In final systems the existence of at least one liquid + nasal cluster implies the existence of at least one liquid + obstruent cluster.

35. In final systems the existence of at least one nasal + liquid cluster implies the existence of at least one obstruent + liquid cluster.

36. In final systems the existence of at least one cluster consisting of nasal + nasal implies the existence of at least one cluster consisting of nasal + obstruent.

37. In initial systems the existence of at least one cluster consisting of obstruent _ nasal implies the existence of at least one cluster consisting of obstruent + liquid.

38. Every language with final clusters contains at least one cluster with a final obstruent in the dental-alveolar region.

39. Every language with initial clusters contains at least one cluster with an initial consonant in the dental-alveolar region.

40. A language which has any affricate includes among them at least one in the dental-alveolar or alveopalatal region.

The consonant clusters in the Tibeto-Burman languages taken under study whether violate or justify these universals or not is clear from the description given below-

In the first 1-4 universals, he generalized the probability of the possible heterogeneous and homogeneous clusters in the languages.

According to the 5th universal, "there are no initial or final systems in which all obstruents combinations are heterogenous in regard to voicing", is generally followed by the languages of this family.

In Tibeto-Burman languages, generally languages like *Purki, Central Monpa* etc. follow this universal but there are languages like *Mishmi* which violate this by having heterogeneous clusters like /ph/. There is no such difference in following this universal in the languages from Himalayan group and the languages from North-East regions.

As per the 6th universal, "In final systems the existence of at least one sequence consisting of a nasal (voiced or unvoiced) followed by a heterorganic obstruent implies the existence of at least one sequence consisting of a nasal (voiced or unvoiced) followed by a homorganic obstruent."

In Tibeto-Burman languages, languages like *Pattani* permits the cluster of /-nd]/ word-finally and the languages of the same family like *Marchha, Kanashi* etc.permit the cluster of *-nt]*. So, this universal is generally followed by the languages of this family.

In the 7th universal, it is assumed that the cluster of at least ST+ST implies the presence of at least ST+FC. This condition is found to be violated by some

languages, e.g. PL+PL combination is permitted in *Thangkhul* and *Darmiya* but the combination of ST+FC is not permitted in these languages but it is permitted in *Kabui* and *Central Monpa*. In this way we can mark out the violation of this universal.

According to the 8th universal, "combination of at least one ST+ST implies at least one FC+ST in word-final system". In the languages concerned, ST+ST clusters are not permitted, so it's not easy to pass any generalization about this universal. Likewise due to the lack of combinations like FC+FC in the languages, it is not easy to justify the 9th universal, which states that the combination of FC+FC implies at least one combination of ST+FC or FC+ST in the word initial system.

The 10th universal states that the combination of at least one FC+FC implies at least one combination of ST+FC or FC+ST in the word final system. *Purki* can be seen as an example for this universal as it follows it clearly. Patterns for the 11th 12th, 13th and the 14th universals are not very clear from the data, so it's difficult to see these universals in the given languages.

It is assumed in the 15th universal, that /l/ sound is never followed immediately by any /r/ type sounds in the initial and final system and /r/+/l/ sequence occurs only with morpheme boundary in initial system. No language is found violating this universal.

The 16th universal is also followed by almost all languages as no clusters have been found like /♦ ੈ/. The 17th universal states that combination of L+Obs. implies the existence of at least one combination of Obs.+L in initial system. In *Purki*, the sequence of L+Obs. is permitted but not vice versa.

The condition i.e. ST+L which implies at least one combination of L+ST for final system as per the 18th universal is not found in the languages. The 19th universal i.e. no combination of Vd G +Obs. is permitted in initial system and vice versa in final system, is followed by the languages considered in this study.

No language is found with the condition required for the 20th universal. In the 21st universal as proposed by Greenberg states that a single or a sequence of voiceless consonants is not preceded by a voiced consonant (except a nasal) initially. There is no instance of /bt/ or /dp/ cluster is found in any languages.

According to 22nd universal, "In initial systems the presence of at least one sequence of Vd N + unvoiced homorganic obstruent implies the presence of at least one sequence Vd N + Vd homorganic obstruent". Languages like *Sema* (it allows the combination of [mp-and a single cluster of [mb- and *Lotha* behave in accordance with this universal.

No language is found to have the combination like the conditions given in the 23rd and 24th universals (see Greenberg's *'Universal of Human language'*). The languages of this family do not fulfil the condition required for 25th universal which proposes that N+L and N+N implies at least one combination of L+L and L+N.

In the 26th universal, it is assumed that "Vd obs. + Vd obs. implies the existence of at least of one combination of Vl obs. + Vl obs". But the languages concerned show evidence of the Vl obs. + Vl obs. clusters only e.g *Purki, Darmiya* etc. This condition is also required for word-final clusters (as suggested by the 27th universal), but there are instances of voiceless obstruent + voiceless obstruent only.

The 28th universal which requires Vd Obs. + N to imply the existence of Vl Obs., is also not valid for the languages concerned as only *Laddakhi* permits clusters of Vl Obs. + N. The 29th universal which supposes that the existence of Vd Obs. + G imply the existence of at least one combination of Vl Obs. + G is generally found in the languages especially Himalayan languages.

The 30th universal is also obeyed in these languages which require Son. + Vd Obs. to imply the existence of at least one combination of Son. +Vl Obs. In this way, we find that universals proposed by Greenberg are generally obeyed by some of the languages and some of the languages violate some of them e.g.

universals like the 33rd and the 37th are generally obeyed in the word-initial position but the universals like the 34th, 35th and the 36th are not found to be fit in these languages, as per the data. Now, we can see the overwhelming nature of the consonant clusters of the languages to derive the universals and to see the variation among the languages. Further this had been an interesting attempt taken by Greenberg to mark the universal properties of the languages just by analysing the patterns of the consonant clusters.

The interest in studying the patterns of consonant clusters to arrive at any theoretical framework took another shape in the study of Leben's (1973) work[13] on OCP (Obligatory Contour Principle), which was originally formulated by him to deal with the tonal phenomenon, and which prohibits the occurrence of adjacent identical sounds at melodic level. In 1981, McCarthy and many others later extended it to segments and other features or group of features.

McCarthy (1986)[14] suggested that the OCP (Obligatory Contour Principle) operates not only as a Morpheme Structure Constraint (MSC), rather as a universal constraint on phonological rules, but also during the derivation as a sort of output condition. In particular, if application of any rule would produce an OCP violation, the rule does not apply. The OCP might not only block such rules but also trigger rules. Odden (1986)[15] presented the effects of OCP on phonological rules operate at different levels. McCarthy posited a process of Tier Conflation by which independent segmental tiers, which correspond to distinct morphemes, are folded onto a single linearized tier. In Tiberian Hebrew, the effect of Tier Conflation can be seen as antigemination effect e.g. '/□/' is not deleted when occurs in between unidentical consonants but fails to apply when schwa is flanked by identical consonants. Moira Yip (1988)[16] showed the widespread application of OCP in phonology with the effects on phonological rules as it acts as a Morpheme Structure Constraints (MSC), rule blocker, rule trigger, constraints on the mode of operation of an ambiguous rule, and constraints on the form of possible rules.

Now, we see the gradual interest developed in the study of consonant clusters throughout with the principle of OCP and the Sonority Scale (SS) of constituents

in the syllable structure to improve the structure of syllable and give adequate answer to the problem of the possible sequence of sounds in the structure. Thus, it was found that the rule based theory differs between languages but they must always respect some fixed set of universal principles. Gradually several universal conditions (like OCP in phonological rules) were attributed to the rules and representations. The development of universal conditions came to logical conclusion in principle and parameters theory (Chomsky 1981, Hayes 1980).

The concept of 'Optimality' (1990) came into vogue in the capacity to give a more adequate explanation by taking constraints into account to see the universals of language and to mark out the variation among languages. The assumption that universal principles can be universal if they are inviolable in every language, took a sharp change when Alan Prince and Paul Smolensky (1993) and John McCarthy & Prince (1993 a, b), turned 'Markedness' as the actual substance of Grammars, which is in the form universal output constraints, filter the optimal output or determines the best output of the grammar with the least violation of the constraints. Later, many more convincing articles came out to justify the applicability of OT to achieve the desired goal of linguistic study. Marie-Helene Cote (2000) wrote her PhD thesis[17] on Consonant Clusters Phonotactics by analysing the deletion and epenthesis processes in a variety of languages, e.g. Quebec French, Ondarroa Basque and Parisian French.

Thus, we can see a major shift in the theoretical approach to answer the basic quests for the universals of language and to account for the variations with the advent of Optimality theory which differs from the earlier generative method to linguistics analysis.

As far as consonant clusters in Indian languages are concerned, Nagamma Reddy (1987)[18] did a typological study of the constraints on consonant sequence across some Indian languages. Nagamma Reddy and Ramakrishnan Reddy (2002)[19] presented patterns of word-initial and word-final clusters in south-central Dravidian languages. The Tibeto-Burman languages have always been discriminated despite of their interesting characteristics. The patterns of

consonant clusters in these languages are very interesting and give rise to some of the problems related to the study of the nature of language.

Optimality Theory (OT):

As it is clear that linguistic study of language generally has two main motives: to see the universals; the types of properties shared in some way by all languages and to see the variation among languages; the types of possible variation or the individual properties of the languages.

Optimality theory is a development of generative Grammar, a theory sharing its focus of the quest for universals among languages. Optimality theory (OT) is the linguistic theory of today and it made its first public debut at the university of Arizona phonology conference in Tucson in April 1991, when Alan Prince and Paul Smolensky presented a paper entitled simply 'Optimality'. In the spring of 1993, Alan Prince and Paul Smolensky came out with an impressive manuscript, *Optimality Theory: Constraints Interaction in Generative Grammar* and later John McCarthy and Alan Prince came up with *Prosodic Morphology: Constraint Interaction and Satisfaction.* Since OT is a theory of generative Linguistics but has had its greatest impact so far in phonology. Optimality theory basically offers a very specific way of looking for the universals and to account for the variation among languages.

In early Generative Grammar (Chomsky 1965, Chomsky and Halle 1968), processes took the shape of rewrite rules, while the major mode of interaction was linear ordering. These rules apply one after another, where one rule's output is the next rule's input. It was found that this rule based theory hardly imposes neither any limits on the notion of 'possible rule' nor on the notion of 'possible rule interaction'. In OT, constraints play a very significant role and determine the nature of the output. Constraints work in all languages i.e. it is a universal property of language but the ranking of the constraints would be different to mark out the variation. Not all universals are manifested in the same way in all the languages however due to variation. Likewise languages do have constraints

working on each output but the ranking of the constraints is different due to variation. Constraints generally work in the languages at all levels e.g. phonological, morphological, syntactic etc. and exist in two forms: Faithfulness and Markedness. Faithfulness constraints allow the input to be same as the corresponding output whereas Markedness constraints filter the given input through the language specific characteristics i.e. the marked properties of the language. The more the robustness of a given property within a language, the less it is close to universality.

"The notion of Markedness plays a very key role, which embodies universality in a 'soft sense'."[20]

The statement above shows that the marked properties of the languages cover the individual properties of languages which are the language-specific properties of the language. The unmarked properties that are there in all the languages are the universal properties of languages. OT's viewpoint of universal grammar is fundamentally different from that of classical rule based generative theory, where UG is defined as a set of inviolable principles or rule schemata (or 'parameters')[21]. In OT, the constraints are violable but to see the variation along with the search for universal.

The fig.2 below shows the mechanism to see how the given output filters through so many possible inputs-

Input

GEN

Candidate (a) Candidate (b) Candidate (c) Candidate (d)

Eval

(Constraints)

Optimal output

Fig 2. A schematic of OT

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Among the various possible outputs, the selection of the optimal output is determined by the ranking of the constraints, which may vary from language to language and ordered in a particular sequence as per the strength of the constraints (from left to right). How it gets filter through the series of constraints to get the required output or what works in the mind of the speaker to respond to the particular output only is generally regulated by the constraints within the languages that permit only particular output.

As words in the languages are composed of syllables, which as phonological constituent serve to organize segments in terms of sonority, in phonological theory have become more significant with passing decade, Diana Archangeli came out with an article, 'Optimality Theory: An Introduction to Linguistics', on the syllable structures of Yawelmani. It proposes the constraints working on the syllable structure of the language i.e. the general tendency of the syllables in Yawelmani is as follow-

a. syllables have one vowel (always)
b. syllables begin with a consonant (always)
c. syllables have at most one consonant at an edge (always)
d. syllables end with a vowel (sometimes)

Here the only violable constraint in this language is NOCODA, and then the types of possible syllables are CV and CVC. Or to put it differently,

		PEAK	ONSET	NOCODA	COMPLEX
>	CV	OK	OK	OK	OK
>	CVC	OK	OK	FALSE	OK
	CVCC	OK	OK	OK	FALSE
	CC	FALSE	OK	OK	OK

Table 2. Syllable Structure of Yawelmani

Here it can be seen that the CV and CVC are the possible syllable structures in the language which generally violated by the other languages e.g. English, which allows Complex onset and complex coda. Thus, it can be said that constraints in

the languages are violated to acquire the desired output, depending upon the rankings of the constraints. As, "string" can be a possible word in English but can't be possible in Yawelmani (syllables begin with a consonant).Thus, we can see the constraints working on the syllable structure of Yawelmani filters the optimal output though a numbers of possible inputs. These constraints as a universal concept act on every language but the rankings of the constraints vary to mark out the variation among the languages.

In all the languages, consonant clusters are permissible in phonological inputs. The Tibeto-Burman languages have always been linguistically rich data to go into the details of its variation and to generalize the recent linguistic theories to make them more adequate and to give them stability. The languages taken into consideration for the present research work generally permit consonant clusters but there are instances where we have some languages which do not permit clusters. It is illustrated in the next chapter that there is a wide range of ways in which consonant clusters distribute themselves within words in the TB languages. There are a number of languages which permit only initial and medial clusters but not word- final, e.g. *Mao-Naga, Angami* etc.There are languages which do permit clusters word-initially and finally but not medially, e.g. *Garo*. In the next chapter, the general constraints working on the consonant clusters of Tibeto-Burman languages have been marked out along with illustration.

CHAPTER IV

CONSONANT CLUSTERS IN T-B LANGUAGES OF INDIA.

This chapter identifies a number of empirical generalizations about the patterns of occurrence of consonant clusters in Tibeto-Burman languages spoken in India. A consonant cluster is a linguistic term, simply meaning a group of consonants, which have no intervening vowel. In English, the group [*spr-* (word-initial) is a consonant cluster in the word 'spring', and the group *–nks*] (word-final) also is, at the end of the word 'thinks'. Many languages do not permit consonant clusters at all. Maori and <u>Pirahã</u>, for instance, do not permit any more than one consonant in a row before another vowel can turn up. Japanese is almost as strict, but it allows clusters of /n/ + consonant: Honshu, the name of one of the major islands of Japan, is an example. A great many of the languages of the world are more restrictive than English in terms of consonant clusters: almost every Austronesian language permits either one-term clusters or slight variations on a theme. Tahitian, Fijian, Samoan and Hawaiian are all of this sort. Standard Arabic does not permit initial consonant clusters, or more than two consecutive consonants in other positions. Most spoken dialects, however, are more permissive.

The patterns of consonant clusters in Tibeto-Burman languages in India are very interesting. As far as the patterns are concerned, there are languages of the same group, which do not bear any resemblance with the other language of the same group. The patterns will be more clear and explicit in the following description of the languages.

Consonant clusters permitted in Tibeto-Burman languages

The patterns of the occurrence of Consonants clusters in the languages concerned are given below with detailed illustration of their positions in the words. Consonant clusters in languages generally found at the different positions in the words: initially, medially and finally. Generally, two consonant clusters are permissible in the languages at all the three positions but there are languages, which allow three consonant clusters or more than that e.g. *Mishmi*. Consonant sounds are classified mainly into two groups- Obstruent (sounds involving constriction which impedes the flow of air through nose or mouth, as in PL(plosive), FC(fricative) and AF(affricate) and Sonorant (sounds produced with free airflow, and a vocal cord position such that spontaneous voicing is possible

as in V(vowel), L(liquid), N(nasal), G(glide)). Clusters are possible of Obs. +
Son. and Son. +Obs as well. The category stop (ST) and plosive (PL) are being
distinguished above because AF as a separate category has been considered in the
data.

4.1. Word-initial Clusters:

4.1.1. Two consonant word-Initial clusters
4.1.1. a. (Obstruent + Sonorant) [C1C2-
4.1.1. a.i. General Types

These are the following consonant clusters permitted in the word initial position.

- [Obs.+G-

   Pattani (e.g. /pja/-'bird', /hjaci/-'to bring back', /tʋači/-'to beg')

- [FC+Son.-

   Purki (e.g. /sman/- 'medicine')

- [PL+Son.-

   Darmiya (e.g. /kmonu/- 'ripe')

- [ST+G-

   Nyam kad (e.g. /gja/- 'hundred')

   Kabui

   Mishmi (e.g. /djú/- 'crutch')

- [FC+G-

   Jad (/sjuṭi/- 'broom'), *Marchha* (/sjoni/- 'horn'), *Darmiya*
   (/sj∂nu/- 'baby boy'), *Chandyangsi* (/sj∂nd∂/- 'child'), *Johari*

(/sjɔ̃ŋ/- 'child'), *Gahri, Spiti* (/ʃjara/- 'blind'), *Nyam-Kad, Tod*
(/ʃju/- 'paper')

Kabui

- [PL+G-

Jad (/ɋjoha/- 'early'), *Marchha* (/dʋaro/- 'again'), *Chhitkuli,*
Chandyangsi (/kʋϑlin/- 'small bells'), *Johari* (/cjaŋ/- 'iron'),
Tinnani (e.g. /khʋalṭri-'to feed'), *Gahri* (/khʋartum/- 'egg'),
Tod (/kjeti/- 'armpit'), *Spiti* (/ɋja/- 'hundred'), *Kanashi*

Laddakhi (e.g. /kjəŋ/- '-----')

Lotha (e.g./pjáp^{h}ēn/- 'kite')

Maring

Manipuri

Apatani (e.g. /pjarmo/- 'leaves put on the arrow')

- [ST+L-
Mishmi (e.g./prà/- 'virtue)

- [FC+L-
Jad (/sʋã/- 'new'), *Chandyangsi* (/slendi/- 'sieve'), *Spiti*
(/srakce/- 'seasoning'), *Dalmiya*(/srib/- 'rib')

- [PL+L-
Naga-Pidgin (/prosar/- 'clergy man')

Jad, Chandyangsi (/brðthim/- 'dew'), *Tod* (/glalð/- 'pure'),
Spiti (krok- 'a crow'), *Kanashi* (/gramðŋ/- 'village')

Sema (e.g. /plakithi/- 'coriander seed')

Maring

Manipuri

Karbi (e.g. /prapʒin/- 'fast')

- [FC+N-

Laddakhi (e.g./sŋon-po/- 'blue')

- [L+Obs.-

Purki (e.g./lčorba/- 'worship')

- [N+Obs.-

Sema (e.g. /mkast/- 'ebony')

Lotha (e.g. /mpóŋ/- 'wind')

- [L+ST-

Laddakhi (e.g. /lgeŋ-bu/- 'balloon')

- [L+FC-

Marchha (e.g. /rha/- 'shy'), *Johari* (e.g. /rhðŋ/- 'horse'),
Spiti,   *Chandyangsi* (e.g. /rhðti/- 'cheek')

- [N+FC-

Marchha (e.g. /nhant∂/- 'good'), *Johari* (e.g. /nhisi/- 'seven'),
Spiti

▪ [ST+Trill-

Tshangla

Garo

▪ [PL+Trill-

Pattani (e.g. /preg/-'broom', /trui/-'six'), *Tinnani* (e.g / kro/-'
Charcoal'), *Gahri, Chhitkuli* (e.g. /tram∂ŋ/- 'copper')

Mao (e.g. /pràkró/- 'forehead'),*Angami* (e.g. /prû/- 'jump')

4.1.1. a.ii. Two consonant Clusters of Restricted Type.

[C1C2-

The following are the languages, which permit only specific clusters.

▪ Only /g/ as C1 is possible with /j/as C2.(*karbi)*

e.g /gjani/- 'wise person'.

▪ Only /s/ as C1 and /j/ as C2.(*Chhitkuli*)

e.g. /sjacn∂ŋ/- 'to see'

▪ *Lotha* permits the cluster of /p/ or /n/ as C1 and /l/ as C2,
e.g. /nl∍pālà/- 'lightening', /plós/- 'blouse'. /h/ as C1 forms
clusters with /r/ or /ʋ/ as C2, e.g. /hrà/- 'to see'. /s/ as C1
forms cluster with /j/ as C2, e.g. /sjári/- 'dance'.

- In *Pattani*, FC as C1 can form cluster only with /j/.

------ If C1 is /m/, then C2 must be /j/ and if C1 is /n/, C2 is /ʋ/.

e.g. /mjo/-'daughter', /nʋaṇḍri/- 'to pull'.

-------If C1 is /r/, then C2 is /ʋ/ only.

e.g /rʋalza/- 'sleepy'.

- Only /s/ as C1 can form cluster with /r/ as C2.(*Tod,*)

e.g /ʃrin/-'cloud'.

- In *Naga-pidgin,* /p,g,ɟ,n/ as C1 can form cluster with /j/ as C2 only and if /s/ is C1, then C2 is restricted to /t/, /ʋ/ or /k/.

e.g /pjas/- 'thirst', /steɟ/- 'stage'.

- In *Mizo*, there are certain consonants, which are permitted to form cluster with some particular consonants only. e.g.

[C1	C2-
/t/	/s/
/r, k, t/	/h/
/h/	/m, r /

/n/   /g, h /

/m/   /h/

/t/   /l/

- Only /h/ as C1 can form cluster with /r/ as C2.(*Tshangla*)

- In *Hmar*, /h/ as C1 can form cluster with /l, r, m/as C2 whereas /t/ as C1 can form cluster with /l/ as C2 only, e.g. /hmùnphĭ/- 'broom', /hrá:t/- 'strong', /tlà:n/- 'run'.

- In *Kului*, the following consonants are allowed to form clusters with the specific consonants only. e.g.

-- If C1 is /s/, then C2 position is restricted to /p, ph, ʋ, j/.

-- If C1 is /ɟ/, then C2 position is restricted to /ʋ/.

-- If C1 is /g/, then C2 position is restricted to /r, l/.

-- If C1 is /ś/, then C2 position is restricted to /j, r/.

-- If C1 is /p, b/, then C2 position is restricted to /j/.

-- If C1 is /g, b, n, d, ś, h, dh/, then C2 position is restricted to /r/.

- If C1 is L/N, C2 is /h/, e.g. /rh∂n̊/-'horse'. *(Tinnani)*

- If C1 is ST, C2 is restricted to /r/.(*Central Monpa*)

4.1.1.b. Two consonant clusters
4.1.1.b.i Obstruent+Obstruent

[C1C2-

The followings are the languages, which permit Obs. + Obs. and   Son. + Son. in the word -initial position.

- [FC+ST-

  Mishmi (e.g. /phu/- 'elf-owl')

  Purki (e.g. /skin/- 'deer (male)), Laddakhi (/skut-pa/- 'thread')

  Kabui

  Garo

- [FC+PL-

  Kanauri,

- [ST+FC-

  Kabui

  Central Monpa

- [PL+PL-

  Tangkhul

  Darmiya (e.g. /ktaṅmu/- 'to be pressed')

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- [PL+FC-

  Maring

  Mizo

  Kanauri

4.1.1.b.ii. Sonorant+ Sonorant

- [N+N-

  Lotha (e.g. /nmát^{h}à/- 'to disgrace')

- [N+L-

  Lotha (e.g. /n^{h}rē/- 'crook')

- [N+ G-

  Purki (e.g. /ñja/- 'fish')

  Dramiya (e.g. /mjã/- 'daughter's husband'), *Johari,*
  Tinnani, Tod (e.g. /mja?ñ̊/- 'hole'), *Pattani* (e.g. /nʋanḍri/-
  'to pull'), *Marchha* (e.g. /mjan/- 'seath')

- [L+G-

  Darmiya (e.g. /ljamu/- 'to fall'), *Chandyagsi* (e.g. /lje/-
  'bull'),*Tod* (e.g.   /rja/- 'forest')

  Spiti (e.g. /lju/- 'flute'), *Chhitkuli* (e.g. /rjus∂ŋ/- 'to ask')

- [Trill. +G-

  Purki (e.g. /rja:sa̱ṭ/- 'state')

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4.1.1.c. Three consonant word-initial clusters

[C1C2C3-

As far as three consonant clusters are concerned, it is not very much clear from the data available to generalize the patterns and to group them accordingly.

- In *Sema*, when C1 is /m/, then C2 should be /p, t, k, l/ and C3 is restricted to /h/. If C1 is voiceless plosives, then C2 is restricted to /h/ and C3 should be palatal approximant. e.g. /amphóbò/- 'hearth' etc.

- In *Mishmi*, the pattern available is like

[C1	C2	C3-
Vl ST/Vl AF	/h/	G/L
e.g	/phlã/-	'stone'	etc.

- In *Purki*, the pattern available is like

[C1	C2	C3-
/FC/or/Trill/	N/ST	/Trill/or G

e.g. /zgru/- 'hunchback', /rɡjap/- 'back' etc.

- In *Lotha*, the pattern available is like

[C1	C2	C3-

/n/or/n̥/   /th/or/k/   /j/

e.g. /ntʰjəkānrəŋ/- 'miser', /ŋkjāāncĭ/- 'ignorant'.

- In *Laddakhi*, the pattern available is like

  [C1   C2   C3-

  /r/, /s/   PL   /j/

  e.g /skjon/- 'fault', /rɡjə-lə/- 'road'.

- In *Johari*, the pattern available is like N+FC+G, e.g. /mhj∂ɳ/-'name'.

- In *Pattani*, the pattern available is like N/or/l/+/h/+/ʋ/

  e.g. /nhʋã/-'young brother', /lhʋ∂r/-'courtyard'.

- In *Mizo*, the pattern available is like

  [C1   C2   C3-

  / t/   / l/   /h/

  / h/   / n/   / g/

  / t /   / s/   / h/

- In *Kullui*, the pattern available is like

  [C1   C2   C3-

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/ n /　　　/h/　　　/j/

/ n /　　　/h/　　　/ ʋ/

/ s/　　　/r/　　　/ j/

4.2. Word-medial clusters:

4.2.2. Two consonant word-medial clusters

4.2.2.a. Obstruent +Sonorant -C1C2-

4.2.2.a.i. General type

These are the following consonant clusters in the word- medial position.

- -Obs. +Son.-

  Maring

- -FC+Son.-

  Darmiya(e.g. /thaznami/- 'beggar')

  Purki (e.g. /čʰusnoṭ/- 'pitcher' , /tusla/- 'during')

- -Pl+Son.-

  Darmiya(e.g. /khokhra/- 'hollow')

  Purki (e.g. /qodraṭ/- 'nature', /rqjapna/- 'after')

  Mising (e.g. /apnam/- 'shooting')

- -ST+G-

  Mishmi (e.g. /páqjà/- 'to sweep')

- -ST+L-

  Mishmi (e.g. /tapři/= 'wild dog')

- -PL+G-

  Gahri, Jad, Marchha (e.g. /tikhja/- 'once'), *Tod,*
  Chandyangsi (e.g. /nipaja/- 'hen'), *Johari* (e.g./l∂gchj∂b/-
  'ring'), *Tinnani, Spiti, Kanashi, Pattani* (e.g /bj∂huthri/-
  'bride')

  Lotha (e.g. /ōjákvè/- 'yard')

  Apatani (e.g. /abja/- 'ladder')

- -PL+L-

  Jad (/ӡhigri/- 'fear'), *Marchha* (/kukri/- 'hen'),
  Chandyangsi(/n∂pla/- 'butter fly'), *Spiti* (/gab-la/-
  'downwards'), *Kanashi, kannauri, Chhitkuli* (/pĉthr∂ŋ/-
  'leaf')

  Sema (e.g. /aklu/- 'lantern')

  Naga-Pidgin (e.g. /phapre/- 'rust')

  Karbi (e.g. /theplak/- 'be fatty (hum)')

  Thankhul (e.g. /pukri/- 'pond')

- -PL+N-

  Gahri, Kanashi (e.g /pakhṇet/- 'wing')

  Naga-Pidgin (e.g. /topma/- 'medal')

Mishmi (e.g. /ɟjábmalù/- 'creator ')

- -FC+G-

  Marchha (e.g. /s∂sto/- 'cheap'), *Chandyangsi, Johari* (e.g. /rh∂ŋsja/- 'sister')

- -FC+L-

  Marchha (e.g. /nhisri/- 'both'), *Chandyangsi* (e.g. /d∂sro/- 'again')

- -L+Obs.-

  Purki (e.g. /zgaltos/- 'mongoose', /alsi/- 'linseed')

- -N+Obs.-

  Manipuri

  Ao (e.g. /mʌŋsa/- 'naked', /jimdi/- 'city', /jančaŋ/- 'bullet' etc.)

  Lotha (e.g. /sɔmtʰɪv/- 'to throw', /pēntsɔ̄/- 'seasame' etc.)

- -G+Obs.-

  Ao (e.g. /ájga/- 'many', /ájši/- 'rub' etc.)

- -G+PL-

  Naga-Pidgin (e.g. /bojtura/- 'mushroom')

  Sema (e.g /aʋkɪzi/- 'sleeve', /ajpu/- 'needle')

- -L+PL-

Jad (/thelgu/- 'dust'), *Marchha, Chandyangsi* (/cirgu/- 'nineteen'), *Spiti, Kanashi, Tod, Darmiya*(/durkhuŋ- 'ground floor'), *Pattani* (e.g. /chərkha/-'spinning wheel'), *Tinnani*

Naga-Pidgin (e.g. /martul/- 'hammar')

Mising (e.g. /kalpi/- 'creeper')

- -L+FC-

Marchha (e.g. /ərsi/- 'mirror'), *Darmiya*(/phərsa/- 'axe')

Mising (e.g. /ŋilzɔn/- 'source of laughter')

- -N+ST-

Naga-Pidgin (/oncʰol/- 'area', /duṅgaʋa/- 'flattery')

Karbi (e.g. /lamkuru/- 'grammar')

Apatani (e.g. /iṅgjè/- 'twin')

Thankhul (e.g. /təmpha/- 'jewel', /tʰiŋtən/- 'log of wood')

- -N+PL-

Jad (e.g. /semɟən/- 'animal'), *Marchha* (e.g. /ləmphu/- 'lamp'), *Chandyangsi* (e.g. /ʋamda/- 'black'), *Spiti, Kanashi, kannauri, Nyam-kad, Johari* (e.g. /rəmko/- 'story'), *Gahri, Pattani* (e.g. /phəmbi/-to fly), *Tinnani , Tod* (e.g. /nəmbu/- 'woollen cloth')

Sema (e.g. /amti/- 'spit')

Mising (e.g. /dumpaŋ/- 'pillow'), *Mishmi* (/nĩmpalañ/-
'ocean')

- -N+FC-

  Marchha, Darmiya (e.g. /laŋsa/- 'excreta of animals'),
  Kanashi (e.g. /mõṇsõŋ/- 'man')

Mising (e.g. /dumsuŋ/- 'deer'), *Mishmi* (e.g. /tĩñzé/-
'banian')

- -L+ST-

  Karbi (e.g. /ɟolpan/- 'breakfast')

- -G+ST-

  Mishmi (e.g. /thajga/- 'hot')

- -PL+trill-

  Tinnani, Pattani (e.g. /kukri/- hen)

Angami (e.g. /úkrə́/- 'parents')

Mao (e.g. /tōkrū- 'be high')

4.2.2.a.ii. Three consonant clusters of Restricted Types

–C1C2–

The followings are the languages, which permit only specific clusters in the
word- medial position.

- In *Hmar*, only two medial clusters are possible i.e. if C1 is /th/, then C2 must be /l/ and if C1 is /n/, then C2 must be VIPL.

e.g /ŋàithlá:k/- 'hear', /tlá:nhmàŋ/- 'to flee'.

- C1 is /n/ and C2 is /g/.(*Mizo*)

- /m/or /n/as C1 can form cluster with /s/ as C2.(*Naga-Pidgin*)

- In *Sema*, the following clusters are possible

-C1	C2-
/ʋ/	N, /j/
/j/	FC, L, /ʋ/
/m/	L
/n/	/j/

e.g. /aʋne/- 'yellow', /ajliqu/- 'buffalo', /ajzi/- 'pond'
etc.

- In *Mishmi*, /h/ as C1 can form cluster with /ʋ/ or L as C2, /ñ/ as C1 can form cluster with /s/and /z/ as C2. e.g. /pilûhʋǎ/-

'Common starling', /kahlejk/- 'intestines', /tjaǹsíñ- 'ring')

- In *Thangkhul*, the possible clusters are as follow-

-C1	C2-
/j/	/m/
/r/	ST

e.g. /məjməŋ/- 'soft ashes', /tʌrkas/- 'addition' etc.

PL sounds as C1 can form cluster with /j/. *(Pattani)*

- In *kanauri*, the consonants that permit only specific consonant to form clusters are as follow:

-C1	C2-
/s/	/r/
/p/, /t/	/j/
/t/, /k/, /l/	/s/
/n/	/s/, /z/

- In *Kului*, the consonants that permit only specific consonant to form clusters are as follow:

-C1	C2-
/m/	/n/
/ʒ/	/r/

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/n/	/dh/
/f/	/t/
/n/	/g/
/d/	/n/
/r/	/j/

- In *Karbi*, the consonants that permit only specific consonant to form clusters are as follow:

-C1	C2-
/ph/or /p/	/r/
/g/	/r/
/l/	/t/, /p/

e.g. /aphraŋ/- 'first, before, /chegriŋ/- 'border portion', /baltiŋ/- 'bucket' etc.

- In *Ao*, the consonants that permit only specific consonant to form clusters are as follow:

-C1	C2-
/t/	/s/
/ĉ/	/ŝ/

e.g. /mĩtsa/- 'fort', /pečši/- 'brush (coat)', /imla/- 'expect' etc.

- L as C1 can form clusters with /s/ as C2, e.g. /qjarsa/- 'ladder'.(*Tod*)

- If C1 is /r/, the position for C2 is restricted to PL/velar FC/N/s/l. (*Apatani*)
  e.g. /ňarka/- 'smile', /armi/- 'ripe', /tarla/- 'cup' etc.

- L as C1 can form clusters with /s/ as C2 and if C1 is /s/,then C2 position is restricted to PL/G/N.(*Gahri*)

- L as C1 can form clusters with /s/ as C2 and when C1 is /s/, then C2 position is restricted to PL.(*Tinnani*)

- L as C1 can form clusters with /s/ as C2.(*Kanashi*)

- In *Chhitkhuli*, /s/ as C1 can form clusters with PL/N as C2 and if /s/ is C2 , then C1 is restricted to PL,e.g./bospa/- 'ashes ', /r∂ksa/- 'demon')

- In *Lotha*, the following clusters are also permitted-

-C1	C2-
/m^h/	/r/
/k^h/	/j/
/r/	/k/, /v/ or / ʋ/

/l/	/lpʰ/or /j/
/j/	/v/ or /n/
/ź/	/ʋ/
/ŋʰ/	/r/
/cʰ/	/j/
/c/	/r/, /j/
/v/	/ts/, /tsʰ/, /ś/, /j/

e.g. /ōzə̄mʰrità/- 'pickpocket', /váchjà/- 'allow', /lə̄vjūtsə̄/- 'mole', /pócə̀žʋò/- 'sky', /kórki̇̀/- 'stable' etc.

- In *Manipuri*, Vd PL as C1 form clusters with L as C2 and the patterns are as follow:

-C1	C2-
/g/	/ c/, /gh/, /l/
/b/	/ l/
/d/	/b/, /r/

- In *Mishmi,* /h/ as C2 form clusters with VI Pl or with/c/ as
  Cl and   if /h/ occurs as Cl, then C2 is restricted to /l/ or
  /ʋ/ only.

e.g /tabróchŏ/- 'hunter', /kahlèjk/- 'intestines'.

4.2.2.b. Two consonant word-medial clusters
4.2.2.b.i. Obstruent +Obstruent

–C1C2-

The followings are the languages, which permit Obs. + Obs. in the word
medial position.

- -PL+PL –

  Jad (/lagpa/- 'arm'), *Marchha* (/chidpa/- 'liver'),   *Darmiya*
  (/cƏkti/- 'a beer'), *Pattani* (e.g. /sƏpti/- 'bark of tree'),
  Nyam-Kad, Spiti, Tod (/nƏpti/- 'bad cold'), *Gahri, Tinnani,
  Kanashi*

  \

  Mising (e.g. /dilatkunam/- 'to return'), *Mishmi* (/tadábtalē/-
  'hawk')

  Ao (e.g. /jakta/- 'soon')

  Sema (e.g. /kiptimï/- 'male')

  Lotha (e.g. /zɜpkáv/- 'to fasten to')

- -Non.PL+PL-
  Kanashi (e.g. /kurti/- 'shirt').

- -PL+Non.PL-

Kanashi (/bh∂gʋan/- 'god'). *Nyam-Kaḍ* (/taglo/- 'bangle')

- -PL+FC-

Jad (/khepsaŋ/- 'fox'), *Marchha, Darmiya*(/daksimu/- 'to quarrel'), *Johari* (/r∂ksa/- 'friend'), *Pattani* (e.g. /gʋaksi/- 'to embrace'), *Chhitkhuli* (r∂ksa/- 'demon'), *Spiti, Gahri, Tinnani, Chandyangsi* (/ph∂ksa/- 'hare')

Loṭha (e.g. /tɘkšɘ/- 'naked')

Mising (/ãdzi/- 'short/small'), *Mishmi* (/káràbsò/- 'wrinkle')

Ao (/lepsʌ̃/- 'cut (meat)')

Thankhul (e.g. /ɔtžan/- 'calculation')

Sema (e.g. /zukza/- 'from')

- -FC+PL-

Jad (/misker/- 'jeolous'), *Marchha, Darmiya*(/k∂rbuch/- 'bags of load'), *Pattani* (/tisk∂r/-'thirst'), *Chandyangsi, Chhitkhuli , Spiti, Gahri,Tinnani*

Sema (e.g. /azbo/- 'water closet')

4.2.2.b.ii. Sonorant +Sonorant.

- -N+N-

Purki (e.g. /ạtamiṅmo/- 'father-in-law')

Manipuri

Pattani (e.g. /joṇṇe/- 'low'), *Darmiya* (/tuŋmu/- 'to drink'),
Nyam-Kad (/minmo/- 'abuse'), *Chhitkhuli, Spiti* (/kunma/-
'Thief'), *Tod* (/kuṅma/- 'theft'), *Jad, Chandyangsi* (/thaŋ-
mi/- 'father-in-law')

Kului

Ao (e.g. /nuŋnaŋ/- 'resent')

Mishmi (e.g. /áhɨmnà/- 'a type of greens)

Sema (e.g. /axamnu/- 'flower')

Loṭha (e.g /pāŋnój/- 'teacher')

- -L+L-
  Gahri, Chhitkhuli (/murli/- 'flute'), *Darmiya, Kanashi*
  (/thurla/-'Foot')

- -G+G-
  Ao (e.g. /aʋja/- 'plunder')

  Sema (e.g. /sejʋi/- 'beatle')

- -N+L-
  Purki (e.g. /sniṅlehmo/- 'virtue')

  Manipuri

  Darmiya(/gomla/- 'left aside'), *Tinnani, Chandyangsi*
  (/h∂mri/- 'Any how')

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Thankhul (e.g. /taŋlen/- 'shelf')

Lotha (e.g. /kʰiŋrán/- 'young')

• -N+G-

Chandyangsi (/ḍaŋjo/- 'to assist'), *Johari* (/bhuŋnja/- 'high')

Purki (e.g. /t̠ʰanja/- 'opposite')

Manipuri

Lotha (e.g. /cə́mjén/- 'impure water')

• -L+N-

Chhitkhuli (/chðrmi/- 'autumn'), *Nyam-Kad* (/karma/- 'star'),
Gahri, Tinnani, Spiti, Darmiya(/tðrnu/-'brave'), *Chandyangi*
(/zðrnðm/- 'east'), *Pattani* (e.g. /cjðrni/- 'check'), *Jad*
(/gorma/- 'to crow'), *Tod* (/kðrma/- 'star')

Purki (e.g. /barmi/- 'broker')

Mishmi (e.g./tîrʋi/- 'swamp')

• -L+G-

Nyam-Kad (e.g. /balʋa/- 'frog'), *Chhitkhuli, Spiti* (e.g.
/silʋa/- 'dew'), *Chandyangsi* (e.g. /thðrʋa/- 'leopard')

Lotha (e.g. /cáljù/- 'earthworm')

• -G+L-

Thankhul (e.g. /cəjrap/- 'rib of a cow')

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4.2.2. c. Three consonant word-medial clusters

-C1C2C3-

As far as three consonant clusters are concerned, it is not very much clear from the data available to generalize the patterns and to group them accordingly.

- In *Purki*, the patterns of the occurrences of consonant clusters are following-

-C1	C2	C3-
ST	Obs.	ST/N/FC/l/G
FC	ST	/r/G
N	Obs.	C
/l/	ST	G
/r/	ST	G

e.g. /bapspa/- 'alight', /cʰuldjaq/- 'moss', /kortjaqs/- 'saucer', /nunskar/- 'day after tomorrow' etc.

- In *Lotha*, the patterns are as follow-

-C1	C2	C3-
/k/	/ch/	/j/
/m/	/k/	/j/

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/n/	/ph/or/th/	/j/
/ŋ/	/k/, /kh/, /ph/	/v/, /j/

e.g. /jākcʰjà/- 'across', /ērɔmkjón/- 'policeman',
/cʰónpʰjáɽi/- 'clay', /kʰāŋkʰvə̀/- 'to carve a figure'.

- In *kabui*, it is similar as two consonant clusters but C3 is either /j/ or/ʋ/.

- In *Marchha*, the patterns are as follow-

-C1	C2	C3-
PL	L	G
FC	L	G
PL	Flap	G
FC	PL	L/G
L	PL	G
PL	PL	G
Flap	PL	G
N	FC	G

e.g. /kokhrjai/- 'armpit' , /dɔ̃gɾja/- 'companion',
/orgja/- 'in olden days' , /nɔ̃msja/-'daughter-in-law' etc.

- In *Darmiya*, the single pattern attested in this language is-

-C1	C2	C3-
N or/s/	PL	L

e.g. /bistra/- 'bedding', /∂ntro- 'last' etc.

- In *Chandyangsi*, the patterns are as follow-

-C1	C2	C3-
N	PL	L
PL	PL	G
N	PL	G
FC	PL	L

e.g. /n∂ŋkro/- 'ant' , /jʊgjja/-'mud' , /nimjja/- '3ʳᵈ day from yesterday' , /mistri/- 'carpenter'.

- In *Pattani*, the patterns are as follow-

-C1	C2	C3-
L	PL	G
N	PL	L

N	PL	AF
N	PL	/s/
PL	PL	Non.PL

e.g. /turpja/- 'bat', /toṇdri/- 'to hang', /triḳthri/- ' to chop' etc.

- In *Gahri*, the patterns are as follow-

-C1	C2	C3-
/l/	PL	G
Vd PL/N	VdPL	/r/
N/PL	/s/	PL

e.g. /gogste/- 'to cough', /sulgjud/- 'flour' etc.

- In *Tod*, the single pattern attested in this language –

-C1	C2	C3-
L	PL	G

e.g. /nolgja/- 'to wrestle'.

- In *Chhitkhuli*, the patterns attested in this language-

-C1	C2	C3-

N/PL/s/r/   / r/p/k/t/d/   /j/r/l/

e.g.   /tubrja/-   'day-before-yesterday,   /cðmkja/-
'bright' etc.

- In *Kanashi*, the single pattern attested in this language-

-C1	C2	C3-
N	PL	/r/or flap

e.g. /mðndris/- 'before' ,/mundṛi- 'a ring'.

- In *Karbi*, the patterns are as follow-

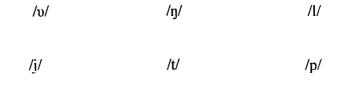| -C1	C2	C3-
/t/	/p/, /ph/	L
/m/	/p/, /ph/, /k/	L
/ŋ/	/p/, /ph/, /k/, /th/	L
/r/	/p/, /ph/	L

e.g. /doŋphlot/- 'slip on foot', /totplak/- 'sit alone' etc.

- In *Ao- Naga*, the patterns are as follow-

-C1	C2	C3-
/ʋ/	/k/	/s/

/ʊ/	/ŋ/	/l/

/j/	/t/	/p/

e.g. /ʌʊksa/- 'frighten', /ʌʊŋlamla/- 'fairy', /tásùájtpa/-
'courage'.

- In *Mishmi*, the patterns are as follow-

-C1	C2	C3-
/ST/	/h/	L or /j/
/j/	ST or /ñ/	ST or /r/
PL	PL or /s/	L or /j/
N	PL or /s/	/l/ or G

e.g /namsjñ/- 'epidemic worship', /ríñkʊág/- 'rabbit' etc.

4.2.2. d. Four or Five consonants word-medial clusters

-C1C2C3C4/C5-

As far as more than three consonant clusters are concerned in Tibeto-Burman
languages, there are only two languages, *Mishmi* and *Purki* are registered.

- In *Mishmi*, the patterns are as follow-

-C1	C2	C3	C4	C5-

/j/	/g/	/b/	L	
/ n/	/j/	/ʒ/	/j/	
/n̊/	/k ,p/	/h/	/j, r/	
/j/	/g/	/p/	/h/	/l/

e.g. /nánjʒjõ/- 'common striped sqirrel', /amèjndran/ -
'cyclone', /macéjgphlù/- 'tap' tec.

- In *Purki*, , the patterns are as follow-

-C1	C2	C3	C4-	
PL	FC	PL	G	
N	FC	PL/FC	/l/ or G	

e.g. /grapsbja/- 'plan', /hlinzbja/- 'hunt' etc.

4.3. Word-final clusters:

These are the following languages, which permit consonant clusters in the word-final position.

4.3.3. Two consonant word-final clusters
4.3.3.a. Obstruent +Sonorant -C1C2]
4.3.3.a.i. General Types

- -N+Obs.]

Purki (e.g. /beñč/- 'bench')

- -G+PL]

  Ao (e.g. /Λʋt/- 'ashes')

- -L+PL]

  Kanashi (e.g. /dhϑrt/- 'earth'), *Marchha* (e.g. /cϑr̥t/- 'hot'),

  Darmiya, *Chandyangsi* (e.g. /s̃irt/- 'sour')

- -N+PL]

  Marchha (e.g. /cϑn̥t/- 'sharp'), *Chandyangsi* (e.g. /jint/-
  'fatigue'), *Kanashi* (e.g. /t̥hin̥t/- 'slave')

- -N+ST]

  Pattani (e.g. /cind/-'anxiety')

- -L+ST]

  Pattani (e.g. /sirph/-'only')

- -Trill+ST]

  Purki (e.g. /poːstcaːrd/- 'postcard')

4.3.3.a.ii. Two consonant word-final clusters of Restricted Types

–C1C2–

The followings are the languages, which permit only specific clusters in the word- final position.

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- If C1 is /k/, /p/, /m/ /ŋ/, then C2 is restricted to /s/ and if C2 is /s/, then C1 is restricted to /t/, /n/, /r/, /l/. e.g. /ʈoks-po/- 'friend', /zers/- 'told' etc.(*Laddakhi*)

- If C2 is PL, then C2 is restricted to L or/s/. (e.g. /dost/- 'friend', /sɔrt/- 'a bet').*(Darmiya)*

- The final cluster is very restricted in nature i.e. C1 as /p/ and C2 as /s/ and vice versa. If C1 is /l/ or /r/, then C2 is restricted to /t/, e.g /ips/- 'sleep', /gɔlt/- 'wrong'.(*Tinnani)*

- If C2 is restricted to /s/, then C1 must be PL, e.g. /trugs/- 'sweat'. *(Gahri)*

- The final cluster is restricted to a single pattern i.e. C1 as /n/ and /g/ as C2.(*Mizo)*

- The clusters occur at the final position of the word in loan words only.e.g. /pejʒ/- 'page'.(*Naga-Pidgin)*

- If C1 is /ʋ/, then C2 can be /t/, /k/, /n/. If C1 is /j/. C2 is restricted to /p/ or /t/. e.g. /ajp/- 'porch', /ʌʊn/- 'blow'.(*Ao)*

- The final cluster is restricted to C1 as /n/ and C2 as /k/.(*Manipuri)*

- If C1 is /j/, then C2 is restricted to /k/, /g/ or /n/. e.g /dájk/- 'language', /ʋàjñ/- 'bowl'.(*Mishmi)*

- In *Thankhul*, the single cluster in this language is-

-C1	C2]
/ʊ/	/t/

e.g. /ʊaʊt/- 'loudly'.

4.3.3. Two consonant word-final clusters
4.3.3.b. Obstruent+Obstruent

-C1C2]

The followings are the languages, which permit only Obs. + Obs. in the word - final position.

- -ST+FC]

  Purki (e.g. /candanilaqcuks/- 'sandal tree')

- -FC+ST/FC]

  Purki (e.g. /ce:laqcuks/- 'teaplant')

- -PL+PL]

  Marchha (e.g. /kh∂takt/- 'bitter'), *Chandyangsi* (e.g. /sipc/- 'comb')

- -FC+PL]

  Marchha (e.g. /sist/- 'dead')

4.3.3.c. Three consonant clusters -C1C2C3]

As far as three consonant clusters are concerned, it is not very much clear from the data available to generalize the patterns and to group them accordingly.

- In *Gahri*, the single pattern attested is as follow-

-C1	C2	C3]
N	PL	/s/

e.g. e.g. /zomr∂ñgs/- 'festival'.

4.4. Geminates:

The term, 'Gemination', refer to the process, whereby identical adjacent consonants occur in a word. Generally, it occurs in the word-medial position. The possible geminates in Tibeto-Burman languages are as follow-

4.4.4. Two consonant geminate clusters-C1C2-

- In *Kului*, the followings are the possible geminates that occur in the word-medial position only.

-nn-

-s̆s̆-

-ḍḍ-

-ll-

-ṭṭ-

-kk-

-ss-

e.g

- In *Mising*, the followings are the possible geminates that occur in the word-medial position only.

-jj-

-L-

-N-

-PL-

e.g. /ajjir/ - 'method of writing', /ɔlluŋ/- 'boat', /jummi/- 'sieep' etc.

- In *Naga-Pidgin*, the followings are the possible geminates that occur in the word-medial position only.

-tt-

-ʒʒ-

-ll-

-nn-

e.g. /gutti/- 'nut', /uʒʒəl/- 'bright', /khulla/- 'open', /unnojs/- 'nineteen'

- In *Karbi*, the single geminate found is

-nn-

e.g. /ʒonni/- 'two (animals)'

- In *Sema*, the followings are the possible geminates that occur in the word-medial position only.

-dd-

-ss-

-ll-

-G-

e.g. /idda/- 'awake', /jessaʋ/- 'pilot', /apullo/- 'choice', /aʋʋe/-
'forest',   /ajjeppú/- 'star'.

- In *Thankhul*, the followings are the possible geminates that occur in the
word-medial position only.

-tt-

e.g. /zəttə/- "participle form of the verb 'to go'".

- In *Purki*, the followings are the possible geminates that occur in the
word-medial position only.

-bb-

-t̲t̲-

-d̲d̲-

-kk-

-nn-

-ll-

e.g. /subba/- 'whisper', /put̲tanma/- 'germinate', /domenna/-
'otherwise', /pʰella/- 'hanging'.

- In *Gahri*, the only examples of germination could be found is

-dd-

-pp-

e.g. /bride/- 'to slip', /sredde/- 'to cough', /thippo/- 'a scarf of ladies'.

- In *Pattani*, the followings are the possible geminates that occur in the word-medial position only.

-c̆c̆-

-t̤t̤-

-mm-

e.g. /ic̆c̆a/- 'very small', /rut̤t̤he/- 'very good', /lamme/- 'very long'

etc.

- In *Kanashi*, the single geminate found is

-cc-

e.g. /keccic/- 'all alone'.

- In *Jad*, the followings are the possible geminates that occur in the word-medial position only.

-ll-

-mm-

-nn-

e.g. /kumma/- 'thief', /menna/- 'without', /phulli/- 'nose screw'.

- In *Marchha*, the followings are the possible geminates that occur in the word-medial position only.

-ST-

-ll-

-ss-

e.g. /rokko/- 'all', /littho/- 'near', /nisso/- 'low' etc.

- In *Darmiya*, the followings are the possible geminates that occur in the word-medial position only.

-ll-

-PL-

e.g. /ch∂ppu/- 'adge', /b∂tti/- 'lamp', /billa/ - 'male cat' etc.

- In *Chandyangsi*, the followings are the possible geminates that occur in the word-medial position only.

-cc-

-ṭṭ-

-nn-

-tt-

e.g. /c∂ṭṭ/- 'at once', /r∂nnu/- 'curd' etc.

- In *Manipuri*, the followings are the possible geminates that occur in the word-medial position only.

-pp-

-tt-

-kk-

-cc-

-mm-

-nn-

-ll-

-jj-

4.5. Morphological alternations and Word boundaries:

The words taken into consideration are polysyllabic and mono-morphemic. Thus, it has not been possible to look for the effects of word-formation or of tier conflation in this study. (see Mc Carthy 1986)

4.6. Critical Discussion on Consonant Clusters in relation to Optimality Theory:

It is clear from the data in the above section, the occurrence of consonant clusters in the languages at three positions in the word i.e. initial, medial and final, can be broadly categorized as follow:

Word-initially:

The condition given below is found to be the general permissible consonant clusters in TB languages that are permitted in almost all languages in the word-initial position. There are languages that violate this general statement about the possible clusters in the concerned languages.

[C1C2-

The basic requirements for the occurrence of consonant clusters in word-initial position in Tibeto-Burman languages are as follow:
The C1 may be any consonant (C) if C2 is L/N/PL/FC or to put it differently
[C1<C>C2-<L/N/PL/FC>

[C1C2C3-

For the three member clusters in the word-initial position, the basic requirements are as follow:
Whatever may be the consonants as C1 or C2 (patterns not clear), C3 has to be G/L.

Word-Medially:

-C1C2-

Like clusters in the initial position, languages generally permit same   patterns of clusters i.e. if C2 may be any consonant (C) if C1 is L/N/PL/FC or to put it differently -C1<L/N/PL/FC> C2<C>-

-C1C2C3-

Whatever consonant may occur at the first position, C2 is restricted to ST/ '/s/' and C3 may be G/L.

-C1C2C3C4/C5-

There is no fixed pattern followed by any of the languages available.

Word-Finally:

-C1C2]

When C1 is L/N, C2 is restricted to ST or to put it differently –C1<L/N> C2<ST>].

-C1C2C3]

Not found in all languages available except *Gahri*.

Geminates:

Generally -PL/N/ '/l/'- sounds occur as geminates in these languages, or to put it differently –C1<PL/N/ 'l'> C2<PL/L/ 'l'>-

The syllable structure of the language shows the maximum possible Onsets and the Codas. The following is the generalized pattern of the consonant clusters in the word-initial and the word-final position.

C1	C2	N	C1	C2
C	L/N/PL/FC	V	L/N/PL/FC	ST

Generally complex onsets and complex codas are permitted in these languages. In the word-medial position, four and five consonant clusters are permitted (Mishmi and Purki). It seems that the two consonant clusters in the word-initial position are the mirror images of the clusters found in the word-initial position. The C3 of the three consonant clusters at the word-initial position is G/L and the C1 of the three consonant clusters in the word-final position is N (Gahri). Therefore, the appearance of G/L/N close to the peak is common to all the languages.

The approach of Optimality theory towards the study of language poses constraints which may be violated or followed by the languages. Thus, the optimality-theoretic constraint for the occurrence of consonant clusters in Tibeto-Burman languages can be termed as Complex Consonant Generalization (CSG). Among complex consonant at the edge of the word, the consonant that appears closest to the Nucleus of the syllable is a sonorant. The Optimality theory accounts for the violation of the constraints because of language-specific rankings of the constraints. As these languages generally permit complex onsets and complex codas, CSG should be ranked higher than the *complex because it is violated in languages allowing CSG. In terms of Panini's Theorem on Constraint-ranking, the specific (CSG) has to be ranked higher than the general (*complex). Hence the elsewhere condition has been determined by the language-specific constraint ranking. Therefore, the *complex has to be lower in the ranking to account for the variation in the languages.

Greenberg (1978) summarised the universal conditions for the occurrence of consonant clusters in the world languages and stated that those combinations are favoured in which sonorants are closer to the nucleus than the obstruents.

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This generalization is favoured by almost all Tibeto-Burman languages except a few. The appearance of PL/ FC close to nucleus in the word-initial and word-final position generally violates this constraint. The languages like Lotha, Sema etc. violate this universal tendency. If we look at the patterns of more than three consonant clusters in the word -medial position, Mishmi and Purki favour this constraint and allow L/N/G to appear close to the nucleus. In Purki, C1 of the four consonant clusters in the word-medial position is the only combination which violates this constraint. Therefore, it can be said that this constraint is very strong as far as these languages are concerned (languages like Mishmi, Darmiya Nyam-kad, Manipuri etc. generally follow this universal constraint at the onset position of the syllable and the languages like Purki, Ao, Chaudangsi, Kanashi etc. follow this universal at the coda position of the syllable). This is a morpheme structure constraint (MSC).

Morpheme structure constraints accounted for more static generalizations concerning the combination of features to define the language's segment inventory and phonotactic constraints on sound sequences (see Kenstowicz's *Phonology in Generative Grammar*, p.524). For example, in most languages, tautomorphemic nasal + consonant clusters share the same point of articulation. So, this can be accounted for with a constraint that bars heterorganic clusters whose first member is a nasal. A single point of inadequacy in that approach is that there are many violations of the constraint which cannot be neatly accounted for. Morpheme combination as well as other rules may create violations of the constraint. Phonological rules serve to the constraint violations. The OT allows the violations and thus provides an account that is consistent with its theoretical claims. As a morpheme constraint, it can be a part of the general group of consonant that were labelled as PARSE i.e. 'underlying segments must be parsed into syllable structure'. (Prince and Smolensky, 1993)

The Basic CV Syllable Theory states that the syllable structure is governed by the Basic Syllable Structure constraints, e.g. ONS, -COD, NUC, *COMPLEX, *M/V, *P/C; PARSE, and FILL (see Prince and Smolensky, 1993, p.96). According to the Basic Syllable Theory, *complex constraint prohibits more than one consonant to

associate to any syllable position node. So, the CSG constraint should be higher in the ranking. The optimal output is depended on the ranking of the constraints. Though the number of languages that follow this universal, there are many languages which generally do not conform to this universal.
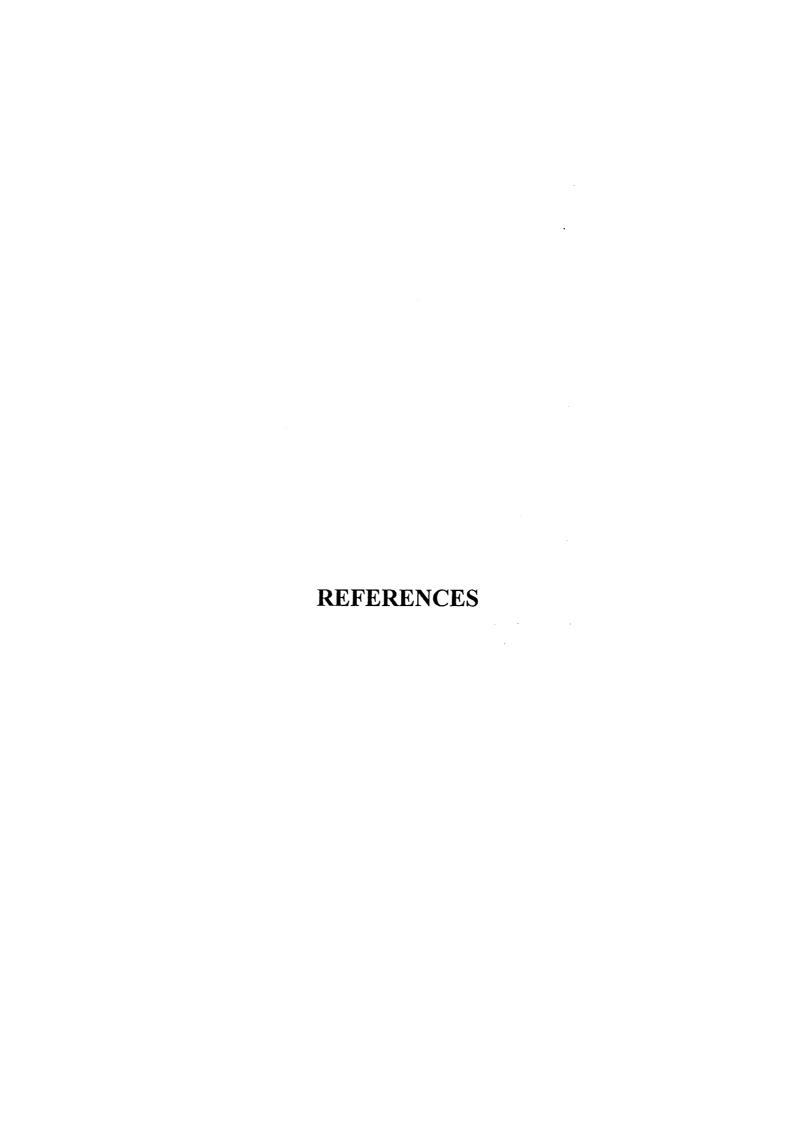
By looking at the data of 36 languages we can find some exceptions but the number of languages that follow it, is greater in number. Now, the primary question comes to the mind that, "why these exceptions are more in numbers in the languages?" If the numbers of exceptions are greater, then the theory of universals of the world language requires being more abstract in its approach to account for the exceptions also.

CONCLUSIONS AND IMPLICATIONS

It can be said by the way of conclusion that the study of consonant clusters in the world languages is one of the tools to achieve the desired goal of linguistic investigation in order to analyse the universal tendency of the language. The universals suggested by Greenberg are violated by many languages of the Tibeto-Burman family but the universal tendency of permitting sonorants close to the nucleus is followed by almost all the languages concerned with the present work. As this study is based on the data of 36 languages of Tibeto–Burman family, the need to see the structure of some more languages is required to justify the universal tendency of the constraint working on the occurrences of consonant clusters. The consonant clusters at the word-initial position is violated by around ten languages which permit clusters of obs.+obs. sounds (Mishmi, Kabui, Kanauri, Central Monpa, Tangkhul etc.) in the word initial position. Likewise, consonant clusters at the word-final position show some exceptions. Consequently, it leaves the scope for the theory to be more abstract to account for the universal tendency and to reduce the exceptions to a greater extent.

Notes

[1] Graham Thurgood and Randy J. LaPolla, *The Sino-Tibetan Languages*, Routledge, London, 2003, p.3.

[2] Austin,H. 1982, "Research on Tibeto-Burman Languages", in Verner Winter (eds.) *Trends in L:inguistics,* State of the Art Report 14, Mouton Publishers. NY.

[3] G. A. Zograph, *Languages of South Asia*, Languages of Asia and Africa (Vol. 3) Routledge & Kegan Paul, London,1982, p.183.

[4] ibid.Pp.184-188.

[5] In 1816, Franz Bopp published his comparative study of Sanskrit, Greek, Latin, Persian and Germanic languages to demonstrate the correspondences between the words of Sanskrit and other Indo-European languages. He wrote the first detailed Indo-European grammar and pointed out the significance of grammatical forms for convenience.

[6] It was only Rask among the early investigators, who was conscious of the significance of the laws of sounds and showed in his study of the Old-Icelandic languages that there was a consistent and regular relationship between the sounds of Germanic languages.

[7] He made an exhaustive survey of the Germanic languages in four volumes and thereby laid the foundations of the comparative treatment of Germanic languages as a whole.

[8] Etymologische Forschungen Auf dem Gebiete der indogermanischen' (comparative grammar of Indo-European languages)

[9] Herman, Paul, 'Principles of the History of Languages'.Quoted in Koerner, E.F.K., 'European Structuralism: Early Beginnings', *Current Trends in Linguistics*.13. Sebeok (ed.) p.778.

[10] The Genevan linguist, whose early work was in philology but he is mainly remembered for his theoretical ideas as summarised in the *Cours de linguistique generale* in 1916 ('Course in general linguistics'), which is widely held to be the foundation of modern subject.

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[20] Rene Kager, Optimality Theory, Cambridge, Cambridge University Press, 1999, P. 2

[21] Principles and Parameters theory proposed by Chomsky in 1981 and Hayes in 1980, which has as its central claim that grammars of individual languages are built on a central core of fixed universal properties (principles), plus a specification of a limited number of universal binary choices.

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